APPENDIX C – NOISE EVALUATION UPDATE

Noise Evaluation Update
for
State Route 126 from East Center Street to Interstate 81
Sullivan County

PIN: 105467.00
Project: 82085-1225-14

Submitted to:

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EXECUTIVE SUMMARY

The noise evaluation for the Preferred Alternative was conducted in accordance with FHWA noise standards, *Procedures for Abatement of Highway Traffic and Construction Noise*, *23 CFR 772* and the Tennessee Department of Transportation's *Policy on Highway Traffic Noise Abatement* effective July 13, 2011.

The study determined that the Preferred Alternative will create traffic noise impacts at 18 residences. Noise barriers were evaluated to mitigate the predicted noise impacts in accordance with TDOT's Noise Policy. In order for noise barriers to be included in a project, they must be determined to be both feasible and reasonable in accordance with TDOT's Noise Policy.

SR 126 is not a limited access facility. In fact, all of the impacted residences have direct driveway access to SR 126. Noise barriers are not feasible to mitigate impacts at these residences because a noise barrier would limit access from these properties and adjacent properties.

Many impacted residences are also isolated from other impacted residences. Noise barriers would not be reasonable since the required area per benefited residence will greatly exceed the allowable area for benefited residence. As a result, noise abatement is not proposed for this project.

1.0 INTRODUCTION

This report updates a previous noise report completed by HMB in October 2010 [1]. The previous study evaluated Alternatives A and B and the results were included in the Draft Environmental Impact Statement (DEIS) for the project. The HMB report is provided in Appendix A.

The previous noise study had to be updated for several reasons. First, a Preferred Alternative has been selected that differs from the previously studied Alternatives A and B. Second, the traffic forecasts for the project were also updated in 2012. Finally, TDOT updated its noise policy in July 2011.

The Preferred Alternative involves the widening and reconstruction of Memorial Boulevard (SR 126) from East Center Street to Interstate 81 (I-81) for a distance of approximately 8.4 miles. The project area is shown in Figure 1.

Specifically, the Preferred Alternative includes four travel lanes (two in each direction) from East Center Street to Harbor Chapel Road. From Harbor Chapel to I-81, the Preferred Alternative includes two travel lanes (one in each direction). There is an additional eastbound travel lane from Harbor Chapel Road to Old Stage Road to accommodate trucks ascending the steep grade. There will be a continuous left-turn lane separating the two travel lanes from Old Stage Road to Harr Town Road.

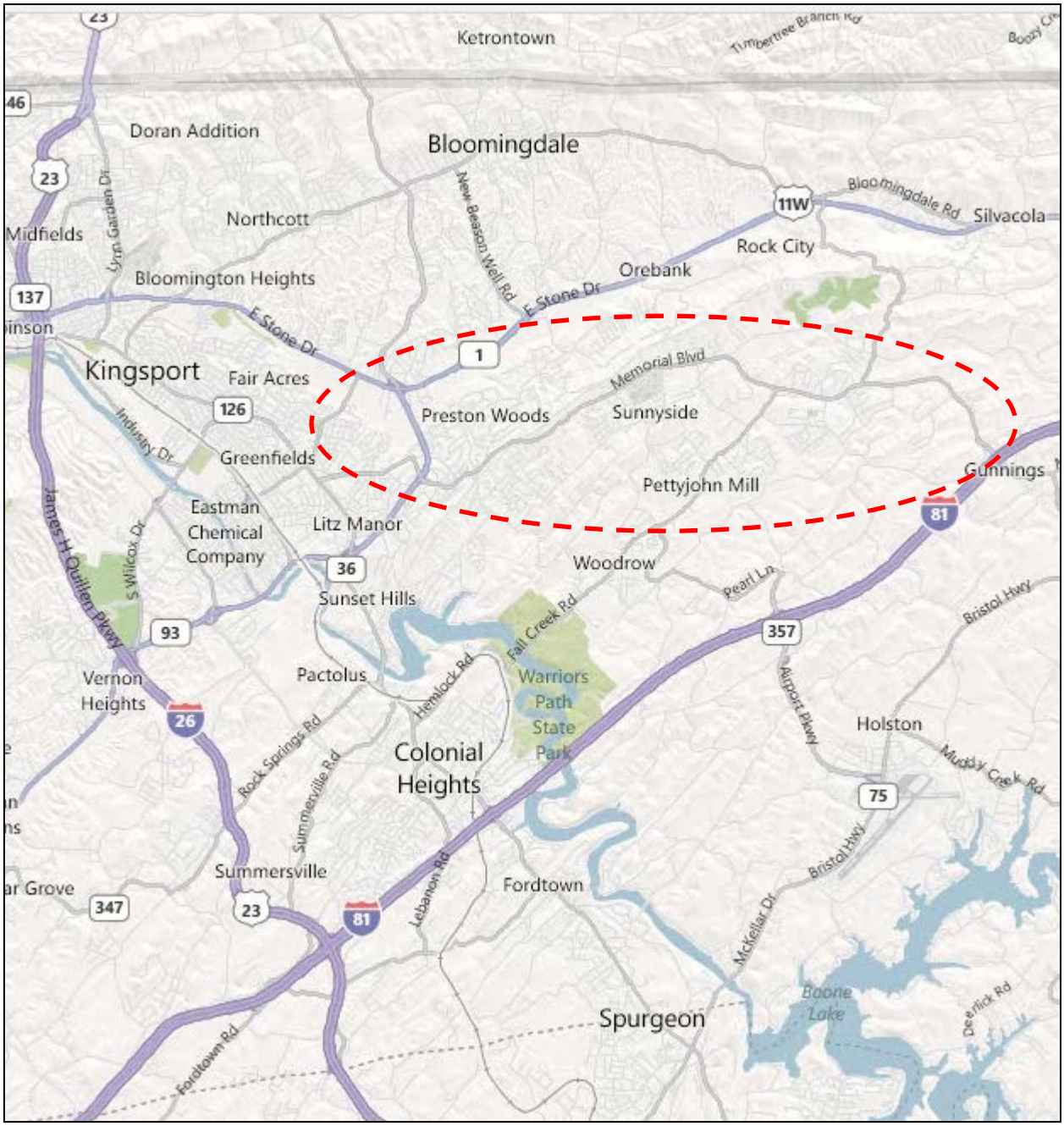

Figure 1: Project Area

2.0 NOISE EVALUATION

This study has been prepared in accordance with the FHWA noise standards, *Procedures for Abatement of Highway Traffic and Construction Noise*, *23 CFR 772* [1], and the Tennessee Department of Transportation's *Policy on Highway Traffic Noise Abatement* [2] and includes the following tasks:

- Identification of noise-sensitive land uses: Identification of existing land uses in the project area that are sensitive to highway traffic noise;
- Determination of existing sound levels: Measurement of existing sound levels at sensitive land uses to characterize the existing noise environment in the project area;
- Determination of future sound levels: Prediction of future, design year, worst-hour sound levels for the No-Build and Build Alternatives;
- Determination of traffic noise impacts: Determination of noise impacts based on the increase in existing sound levels, as well as design year sound levels;
- Noise abatement evaluation: Evaluation of noise abatement for land uses determined to be impacted by the project;
- Discussion of construction noise; and,
- Coordination with local officials.

Each of these analysis steps is discussed below following a discussion of TDOT's criteria for determining noise impacts.

2.1 Criteria for Determining Impacts

2.1.1 Traffic Noise Terminology

Traffic noise levels are expressed in terms of the hourly, A-weighted equivalent sound level in decibels (dBA). A sound level represents the level of the rapid air pressure fluctuations caused by sources such as traffic that are heard as noise. A decibel is a unit that relates the sound pressure of a noise to the faintest sound the young human ear can hear.

The A-weighting refers to the amplification or attenuation of the different frequencies of the sound (subjectively, the pitch) to correspond to the way the human ear "hears" these frequencies. Generally, when the sound level exceeds the mid-60 dBA range, outdoor conversation in normal tones at a distance of three feet becomes difficult. Figure 2 shows some typical indoor and outdoor sound levels.

A 9-10 dB increase in sound level is typically judged by the listener to be twice as loud as the original sound while a 9-10 dB reduction is judged to be half as loud. Doubling the number of sources (i.e. vehicles) will increase the hourly equivalent sound level by approximately 3 dB, which is usually the smallest change in hourly equivalent A-weighted traffic noise levels that people can detect without specifically listening for the change.

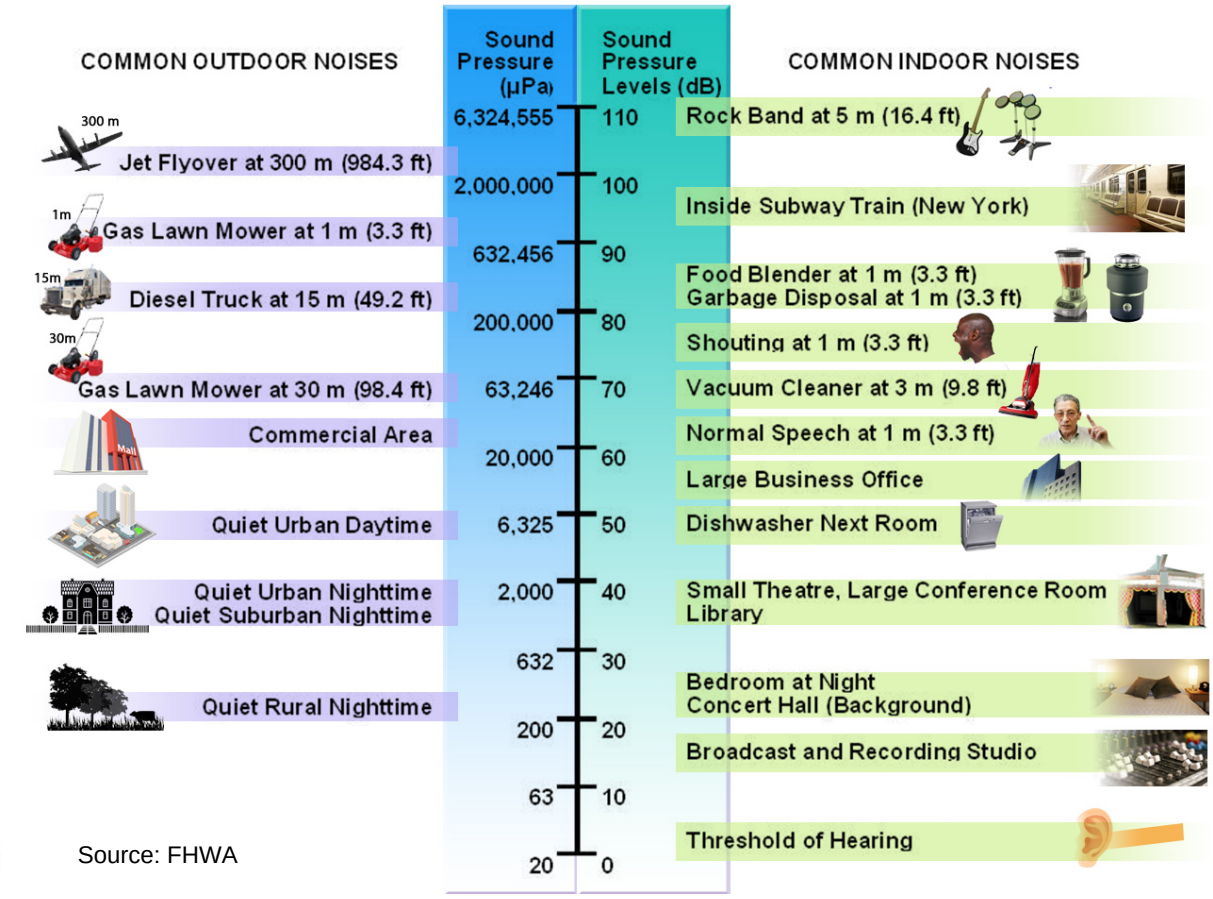

Figure 2: Typical Sound Levels

Because most environmental noise fluctuates from moment to moment, it is standard practice to condense data into a single level called the equivalent sound level (L_{eq}). The L_{eq} is a steady sound level that would contain the same amount of sound energy as the actual time-varying sound evaluated over the same time-period. The L_{eq} averages the louder and quieter moments, but gives much more weight to the louder moments in the averaging. For traffic noise assessment purposes, L_{eq} is typically evaluated over the worst one-hour period and is defined as L_{eq} (1h).

The term insertion loss (IL) is generally used to describe the reduction in L_{eq} (1h) at a location after a noise barrier is constructed. For example, if the L_{eq} (1h) at a residence before a barrier is constructed is 75 dBA and the L_{eq} (1h) after a barrier constructed is 65 dBA, then the insertion loss would be 10 dB.

2.1.2 Noise Abatement Criteria (NAC)

Noise impact is determined by comparing future project sound levels: (1) to a set of Noise Abatement Criteria (NAC) for a particular land use category, and (2) to existing sound levels.

The FHWA noise standards (contained in 23 CFR 772) and TDOT's Noise Policy state that traffic noise impacts require consideration of abatement when worst-hour sound levels approach or exceed the NAC listed in Table 1.

The FHWA noise standards and TDOT's Noise Policy also define impacts to occur if there is a substantial increase in design year sound levels. Table 2 presents TDOT's criteria to define substantial noise increase.

2.2 Identification of Noise-Sensitive Land Uses

Review of available electronic mapping revealed over 200 Category B residences adjacent to SR 126 that might be impacted by the project. These uses include both single-family homes and apartments.

The Holston Manor nursing home and the East Lawn Memorial Park cemetery are also located near SR 126 within the project limits. The exterior of the nursing home and cemetery are classified as Category C land uses. For cemeteries, frequent human use areas include exterior areas where services are held on a regular basis but do not include individual grave sites. Therefore, only the exterior of the cemetery building used for services was assessed for impacts.

Noise impacts at the residences, nursing home, and cemetery will be identified and noise abatement will be considered if design year sound levels are 66 dBA or higher or if there is a substantial increase in existing sound levels.

There are some Category F industrial and retail properties located within the project limits. As indicated in Table 1, these land uses are not noise-sensitive and do not have an NAC. Therefore, they have not been included in the noise study.

Finally, there are some tracts of Activity Category G undeveloped lands that exist along the project. These undeveloped lands are not noise-sensitive and have not been included in the noise analysis. However, noise impacts could occur in the future if noise-sensitive land uses are constructed near SR 126. A discussion of future sound levels and the need for noise-compatible land use planning is provided later in this report.

It is important to note that several properties or portions of properties will be taken for the Preferred Alternative. Properties that are shown in the current plans to be taken have not been included in the noise analysis.

2.3 Determination of Existing Sound Levels

Noise measurements were conducted by HMB during peak travel times at several noise-sensitive land uses in the project area on April 30, March 20 and 21, and May 11, 2008. Table 3 summarizes the sound levels at the measurement locations.

Table 1: Noise Abatement Criteria in 23 CFR 772

Activity Category	***L_{Aeq}(1h) dBA***	***Evaluation Location***	***Activity Description***
A	57	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B(1)	67	Exterior	Residential.
C(1)	67	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structure, radio stations, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structure, radio studios, recording studios, schools, and television studios.
E(1)	72	Exterior	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A-D, or F.
F	–––	–––	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	–––	–––	Undeveloped lands that are not permitted.

(1) Includes undeveloped lands permitted for this activity category.

Table 2: Substantial Noise Level Increase

Existing Noise Level (dBA) (1)	***Predicted Design Year Noise Level Increase (dB)*** (2)
42 or less	15 or more
43	14 or more
44	13 or more
45	12 or more
46	11 or more
47 or more	10 or more

(1) Worst hour noise level from the combination of natural and mechanical sources and human activity.
(2) Predicted design year noise level minus existing noise level.

Table 3: Existing Sound Levels at Measurement Locations

Location (Receiver in HMB Report)	*Distance to SR 126 (feet)(1)*	*Date*	*Period*	*Peak Hour L_{eq}(1h) (dBA)(2)*
3213 Memorial Blvd (Rec 01)	35	3/21/2008	7:20-7:39 AM	63
3701 Memorial Blvd (Rec 03)	90	3/21/2008	8:10-8:29 AM	63
3996 Memorial Blvd (Rec 24)	60	5/11/2008	2:50-3:09 PM	66
4216 Skyland Lane (Rec 06)	180	3/20/2008	11:22-11:42 AM	59
4321 Trinity Lane (Rec 23)	150	5/11/2008	2:23-2:42 PM	60
4500 Old Stage Road (Rec 22)	100	5/11/2008	1:55-2:14 PM	62
4541 Old Stage Road (Rec 07)	375	3/20/2008	11:52-12:12 PM	44
4609 Old Stage Road (Rec 08)	420	3/20/2008	12:22-12:41 PM	44
4701 Memorial Blvd (Rec 21)	230	5/11/2008	1:28-1:49 PM	55
105 Hobbes Street (Rec 20)	285	5/11/2008	10:58-11:17 PM	49
6290 Chestnut Ridge (Rec 10)	150	3/20/2008	12:48-1:07 PM	58
143 Island Road (Rec 11)	290	3/20/2008	1:16-1:35 PM	58
5340 Memorial Blvd (Rec 17)	105	5/11/2008	8:55-9:14 AM	55
210 Old Fall Creek Road (Rec 12)	280	3/20/2008	1:42-2:01 PM	56
104 Natchez Lane (Rec 05)	205	4/30/2008	4:00-4:19 PM	57

(1) From proposed edge-of-pavement.
(2) Based on sound levels at reference microphone.

A review of historic traffic data for SR 126 in the project area indicates that the year 2008 AADT on SR 126 east of State Route 93 (SR 93) was 9,559 vehicles per day (vpd) while the year 2012 AADT was slightly lower at 9,340 vpd. This small decrease in traffic would have a negligible effect on sound levels. As a result, the sound levels measured in 2008 are considered to be representative of existing sound levels. As shown, existing peak hour sound levels at the measurement locations range from 44 to 66 dBA.

2.4 Determination of Future Sound Levels

TDOT developed traffic projections for the project for the design year 2037. These projections include traffic volumes for the "design hour" which represents a theoretical worst traffic condition. These design hour traffic projections were used for the noise analysis since they represent the highest number of vehicles expected to travel on SR 126 in a given hour and would, therefore, represent the worst noise hour. The design year traffic projections are summarized in Appendix B.

2.4.1 No-Build Alternative

Sound levels for the No-Build Alternative can be reasonably estimated by evaluating existing and future traffic volumes on SR 126. As noted previously, doubling the traffic on a roadway would result in a 3 dB increase in the sound level at a given receiver assuming all other conditions remain the same. Design year 2037 traffic volumes on SR 126 are predicted to increase between 2% and 35% depending on location as summarized in Table 4.

Table 4: Year 2017 and 2037 Traffic Projections, SR 126

From	*To*	*Percent Increase in AADT*	*Sound Level Increase (dB)*
East Center Street	Island Road	26% - 35%	1
Island Road	Hill Road	12% – 18%	1
Hill Road	I-81	2% - 10%	0

These traffic increases would increase sound levels by 0 to 1 dB at nearby land uses. As a result, existing sound levels were increased by 0 to 1 dB (depending on location) to arrive at design year 2037 sound levels for the No-Build Alternative at the measurement locations shown in Figure 3.

2.4.2 Build Alternative

Noise modeling of the Preferred Alternative was completed using the FHWA Traffic Noise Model (TNM 2.5) computer program in accordance with *TDOT Guidelines for Noise Modeling Using FHWA's Traffic Noise Model* [3]. The program calculated design hour equivalent sound levels in year 2037 for the noise-sensitive land uses in the project area including the measurement locations.

Microstation design files for the conceptual plan were used to develop the TNM runs. In developing the TNM files, the points of TNM objects, including roadways, receivers, barriers, terrain lines, and building rows, were first digitized into Microstation. Microstation's coordinate export features were then used to write these points to comma separated variable text files. The points from the text files were pasted into TNM. Finally, a DXF file was created with background text to ease the input of receiver name and elevation data into the TNM files.

As stated above, design year traffic projections provided by TDOT were used for the noise analysis. These projections indicated that 2% to 4% of the design hour volumes on SR 126 are trucks, as shown in Appendix B. The proposed design speeds of 35 to 45 mph on each section of SR 126 were modeled.

The predicted design year sound levels for the modeled receivers are summarized in Table 5 and are discussed in the following section. TNM plan views showing all modeled TNM objects, including the locations of the modeled roadways and receivers, are provided in Appendix C. Tables showing the predicted sound levels at each modeled receiver are provided in Appendix D.

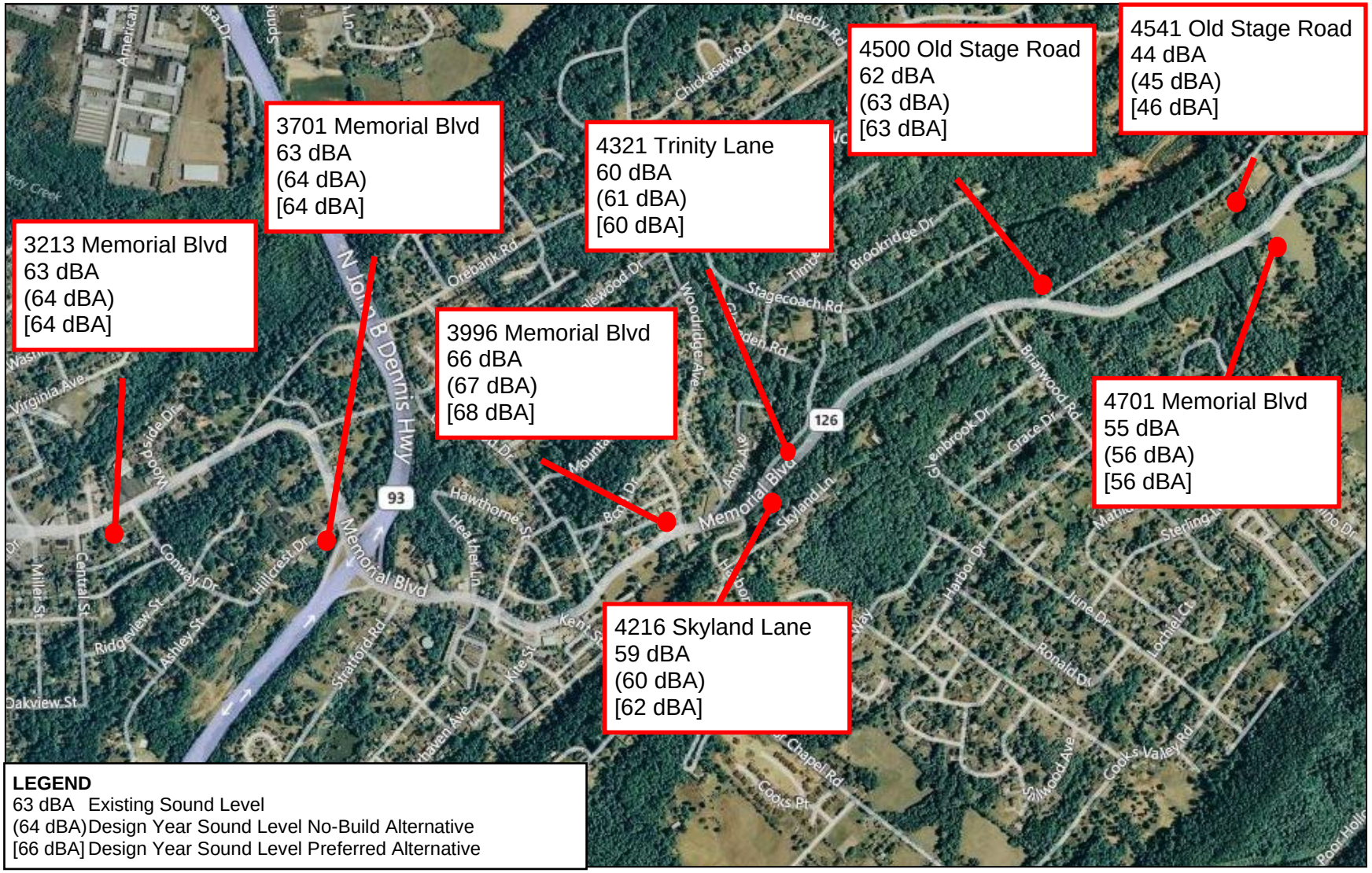

Figure 3: Existing and Design Year 2037 Sound Levels

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Table 5: Impact Determination Analysis, Design Year 2037

Alternative	*Design Year Sound Levels (dBA)*	*Impacted based on NAC?*	*Number of Impacts*
Preferred	44 – 68	Yes	18

2.5 Impact Determination Analysis

As noted previously, a location is impacted if 1) the predicted worst hour noise level approaches or exceeds the NAC or 2) there is a substantial increase in design year noise levels above existing noise levels.

Design year sound levels for the Preferred Alternative are predicted to between 0 and 4 dB higher than existing sound levels. These increases are not substantial according to TDOT's Noise Policy. Therefore, none of the receivers are predicted to be impacted by a substantial increase in sound level. Additionally, sound levels at some residences will be reduced with the project due to the SR 126 alignment being shifted farther away.

As shown in the tables in Appendix D, design year sound levels at most receivers are predicted to be below the NAC. However, 18 residences are predicted to be impacted with design year sound levels of 66 dBA or higher.

The nursing home and cemetery are not predicted to be impacted.

2.6 Noise Abatement Evaluation

Abatement is generally evaluated when impacts are predicted to occur. Noise barriers were evaluated to reduce sound levels for impacted land uses. In order for noise barriers to be included in a project, they must be determined to be both feasible and reasonable in accordance with TDOT's Noise Policy as discussed below.

Feasibility means that: (1) the construction of a barrier would not be anticipated to pose any major design, construction, maintenance, or safety problems; and, (2) the noise barriers will provide a noise reduction (or insertion loss) of 5 dB reduction in design year highway traffic noise levels for the majority of the impacted first-row receptors.

SR 126 is not a limited access facility. In fact, all of the impacted residences have direct driveway access to SR 126. Noise barriers are not feasible to mitigate impacts at these residences because a noise barrier would limit access from these properties and adjacent properties.

Some of the impacted residences are also isolated from other impacted residences. Noise barriers for isolated residences are not reasonable since the required area per benefited residence will greatly exceed the allowable area for benefited residence. As a result, noise barriers were determined not to be feasible or reasonable for this project.

2.6.1 Statement of Likelihood

Noise abatement is not proposed for this project.

2.7 Construction Noise

It is expected that TDOT's construction specifications will apply to this project. As a result, construction procedures shall be governed by the *Standard Specifications for Road and Bridge Construction* as issued by TDOT and as amended by the most recent applicable supplements. The contractor will be bound by Section 107.01 of the Standard Specifications to observe any noise ordinance in effect within the project limits. Detoured traffic shall be routed during construction so as to cause the least practicable noise impact on noise-sensitive areas.

2.8 Information for Local Officials

There are tracts of undeveloped land adjacent to SR 126. TDOT encourages the local governments with jurisdiction over these lands, as well as potential developers of these lands, to practice noise compatibility planning in order to avoid future noise impacts. The following language is included in TDOT's Noise Policy:

> *"Highway traffic noise should be reduced through a program of shared responsibility. Local governments should use their power to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway or that the developments are planned, designed and constructed in such a way that noise impacts are minimized."*

Two guidance documents on noise compatible land use planning are available from FHWA. [4, 5]

Table 6 presents design year sound levels for areas along SR 126 where vacant and possibly developable lands exist. Noise predictions were made at distances between 50 and 300 feet from the centerline of the near lane for the design year 2037. As indicated, sound levels within approximately 100 feet of the centerline of the near lane of SR 126 will approach or exceed the NAC of 66 dBA. Noise-sensitive land uses should generally not be constructed in these areas unless noise mitigation measures are provided.

Table 6: Design Year 2037 Sound Levels for Undeveloped Lands

Distance from SR 126[(1)]	***L_{eq} (1h) (dBA)[(2)]***
50 feet	67
100 feet	64
200 feet	59
300 feet	55

(1) Perpendicular distance to the center of near lane.
(2) At-grade situation.

The values in Table 6 do not represent predicted levels at every location at a particular distance back from the roadway. Sound levels will vary with changes in terrain and will be affected by the shielding of objects, such as buildings. This information is being included to make local officials and planners aware of anticipated highway noise levels so that future development will be compatible with these levels.

Finally, TDOT currently has an active Type II Noise Barrier Program to facilitate the construction of "retrofit" noise barriers along existing highways. To be eligible for a Type II noise barrier, an area must meet the following criteria:

- The neighborhood must be located along a limited-access roadway;
- The neighborhood must be primarily residential;
- The majority (more than 50%) of residences in the neighborhood near the highway pre-dated the initial highway construction;
- A noise barrier for the neighborhood must not have been previously determined to be not reasonable or not feasible as part of a new highway construction or through-lane widening study (Type I project);
- Existing noise levels measured in the neighborhood must be above the Noise Abatement Criteria (NAC) of 66 dBA;
- A barrier must be feasible to construct and will provide substantial noise reduction; and,
- A barrier must be reasonable (barrier cost per benefitted residence) in accordance with TDOT's Noise Policy. A residence is considered "benefitted" if the noise barrier will reduce the traffic noise by at least 5 dB.

3.0 REFERENCES

[1] *Highway Traffic Noise and Air Quality Analysis, State Route 126 (Memorial Boulevard) from East Center Street in Kingsport to Interstate 81*, October 2008, Revised October 2010.

[2] *Policy on Highway Traffic Noise Abatement*, Tennessee Department of Transportation, July 13, 2011.

[3] *TDOT Guidelines for Noise Modeling Using FHWA's Traffic Noise Model,* Tennessee Department of Transportation, April 2010.

[4] *The Audible Landscape: A Manual for Highway Noise and Land Use*, FHWA, November, 1974. http://www.fhwa.dot.gov/environment/audible/index.htm

[5] *Entering the Quiet Zone: Noise Compatibility Land Use Planning*, FHWA, May, 2002. http://www.fhwa.dot.gov/environment/noise/quietzon

Appendix A
HMB SR 126 Noise Report

STATE ROUTE 126 (Memorial Boulevard)
FROM EAST CENTER STREET IN KINGSPORT,
TO INTERSTATE 81, SULLIVAN COUNTY, TN

HIGHWAY TRAFFIC NOISE AND
AIR QUALITY ANALYSES

OCTOBER, 2008
REVISED OCTOBER, 2010

This document identifies and assesses the potential highway traffic noise and air quality impacts associated with the project to improve the existing State Route 126 (Memorial Boulevard) Roadway, beginning at East Center Street in Kingsport, east to Interstate 81 in Sullivan County. The project's total length for the proposed improvements is approximately 8.4 miles.

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1. Introduction

The highway generated noise impacts of this project have been analyzed in accordance with the "Highway Traffic Noise Analysis & Abatement, Policy and Guidelines," and Federal Register Regulation 23 CFR Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise."

These regulations set forth a five-step highway project noise analysis as follows: (1) Identify existing or planned land use activities that may be affected by highway noise; (2) Determine existing noise levels; (3) Predict future highway noise levels; (4) Determine impacts by comparing existing levels with predicted levels and criteria contained in 23 CFR Part 772; and (5) Consider and examine noise abatement measures for those impacts that have been identified. The following is a description of the noise analysis for the project.

2. Project Description

The proposed project is the widening and reconstruction of Memorial Boulevard (SR 126). The project is approximately 8.3 miles in length and is located east of Kingsport, TN. The project begins approximately 1500 feet from Fort Henry Drive and proceeds east, terminating in an interchange with Interstate 81. The location of the project corridor and the alternatives are shown in Figure 2.1 on pages 5-8.

3. Project Alternatives

3.1 The No-Build Alternative

The No-Build Alternative would involve no re-design and re-construction of SR 126, and it would leave the existing roadway in place as it now exists. Some minor improvements as recommended in the Road and Safety Audit Report (RSAR) have been completed. Only normal maintenance activities would occur.

This alternative does not meet the project's Purpose and Need. It would not provide improvements to provide traffic relief or improved safety conditions in eastern Kingsport and Sullivan County. Positive benefits associated with the No-Build Alternative include no relocations of residences, businesses and utilities. Temporary effects associated with construction, including construction noise, dust, and traffic delays would not be experienced with the No-Build Alternative. Negative impacts related to the No-Build Alternative would include continued safety problems; i.e., delayed response for emergency vehicles, lack of passing opportunities, crash rates that exceed state crash rate averages, and substandard LOS's.

3.2 Build Alternatives

3.2.1 Alternative A

Alternative A's western terminus would be located at the junction of SR 126 with East Center Street. This terminus would feature either a signalized intersection or a *roundabout* to facilitate safe, efficient movement of traffic without the need for traffic signals. A roundabout is a type of road intersection at which traffic enters a one-way stream around a central island.

From the western terminus, Alternative A would proceed to a point at Orebank Road. It would include four 11-foot travel lanes. A raised, landscaped median and a 4-foot paved shoulder for bicycles would be included. Sidewalks would be featured on both sides of the road. A curb and gutter would be included, and a roundabout with flared right turns at East Center Street is the preferred option. A second option, which would maintain the existing traffic signal at East Center Street, is still under consideration. This four-lane, raised median section would continue to the Orebank Road area of the project. The design speed is 35 mph.

From Orebank Road to West of Hawthorne Street, Alternative A would continue as four 11-foot lanes with a raised, landscaped median. The 4-foot shoulder for bikes would remain, as would sidewalks on both sides. Curb and gutter features would continue. A median opening would be included for the Sun Bridge Hillside Care and Rehabilitation Facility. Additional features in this section include closing Edens Ridge Road intersections, and improving northbound John B. Dennis exit ramp to eastbound SR 126 to reduce vehicle conflicts. Right turns would use a traffic signal. This configuration would continue to a point west of Hawthorne Street. The design speed remains at 35 mph.

From a point west of Hawthorne Street to Harbor Chapel Road, Alternative A's four 11-foot lanes would continue, but the median would change to a center turn lane in place of the raised, landscaped median. The 4-foot shoulder, sidewalks on both sides, and the urban curb and gutter would remain on this section of the proposed improvements to SR 126. The design speed would remain at 35 mph. This section proposes to close Milton Court at SR 126. Milton Court traffic would be provided alternate access via Stratford and Kite Streets. Hawthorne Street's intersection with the south side of SR 126 would be closed. In addition, the Kent Street intersection with SR 126 would be closed with access being provided via Kite Street. The Amy Avenue/Woodridge Avenue intersection would be closed and tied in to Glenwood Street. Trinity Lane would be closed and alternate access would be provided via a new connection near the cemetery (access to SR 126 via Orebank Road). The design speed would remain at 35 mph.

From Harbor Chapel Road to a point east of Old Stage Road, Alternative A would continue as four 11-foot lanes, featuring a raised landscaped median, two 4-foot shoulders, two sidewalks, curbs and gutters. The design speed in this section would increase to 45 mph. The intersection of Tanglewood with existing SR 126 would be closed, with Tanglewood now tying into Briarwood Road. Old Stage Road would be

realigned to create a 90 degree intersection, effectively decreasing the steepness of the existing Old State Road.

Alternative A would proceed from the point east of Old Stage Road to Cooks Valley Road as four 11-foot lanes with a raised, landscaped median, two 8-foot stabilized shoulders (6 feet of paved shoulder on each side), no sidewalks, curbs or gutters, and a design speed of 45 mph. Pedestrians and bicyclists would be allowed to use the 6-foot shoulders. This section would connect Holiday Hills Road to Shuler Drive via Parker Street. It is proposed to close the Shuler Drive intersection with existing SR 126, and redirect the traffic to Lemay Drive. In addition, Chestnut Ridge Road and Eaton Station Road would be realigned, with left turn lanes onto Cooks Valley Road and Eaton Station Road.

From Cooks Valley Road to Harrtown Road, Alternative A would feature two 11-foot travel lanes with a center turn lane. The design speed would remain at 45 mph. The 6-foot shoulders on both sides would remain, but would not include gutter pans. Bicyclists could still use the 6-foot shoulders, but pedestrians would be provided with sidewalks on both sides of the proposed improvement. A curb and gutter would also be featured in this section. Red Robin Lane would be closed with access being provided via Bridwell Heights Road. Woodsway Drive, Island Road and Natchez Lane would be realigned.

From Harrtown Road to Cochise Trail, the project would continue as two lanes, but each would be expanded to 12 feet in width. No median would be included in this section. The shoulders would be expanded to 10 feet in width allowing pedestrians and bicyclists access. No sidewalks, curbs or gutters are included in this section. An 18-inch center line crossover deterrent using a rumble strip and striping would be included to deter drivers from crossing into the opposing lane. Rumble strips would also be included between each of the two travel lanes and their shoulders to deter drivers from drifting out of the travel lanes. The design speed would remain at 45 mph.

From Cochise Trail to I-81, the project would include two 12-foot travel lanes, but no median, sidewalks, curbs or gutters. The center line crossover deterrent would continue, and an improved transition area from the four-lane SR 126 area at I-81 will be featured. The 10-foot shoulders would continue through this section allowing pedestrians and bicyclists access. The design speed would remain at 45 mph. The project would require turn lane construction by future developers throughout this section. Gravel Top Road would be realigned on the western intersection with SR 126 and it would be closed east of the intersection.

3.2.2 Alternative B

Alternative B begins at East Center Street at the same point as Alternative A. Alternative B is a refinement of Alternative A, with changes made to minimize impacts to Yancey's Tavern and the East Lawn Cemetery. It utilizes the same cross-sections as Alternative A, but the two-lane section begins further west of Yancey's Tavern and the cemetery, and minimizes visual impacts to the Yancey's Tavern and relocation of gravesites in the East Lawn Cemetery. The elevations of the proposed centerline of Alternative B were

changed to minimize excavation and fill impacts during the construction of the roadway. Portions of the alignment feature slight changes to provide an efficient maintenance-of-traffic plan.

Alternative B in the western area of the project is slightly widened, and a roundabout is proposed for the intersection with East Center Street. The proposed design speed for the urban portion of this project is 35 mph from East Center Street to Hawthorne Street. As Alternative B leaves the Hawthorne Street area, it would transition to a four-lane highway with a 45 mph design speed. As it approaches the Chestnut Ridge area, it would feature two driving lanes and a center turn lane. This would avoid acquisition of the Yancey's Tavern area. Alternative B would require no relocation of gravesites within the East Lawn Cemetery. The 45 mph design speed would be continued through this section.

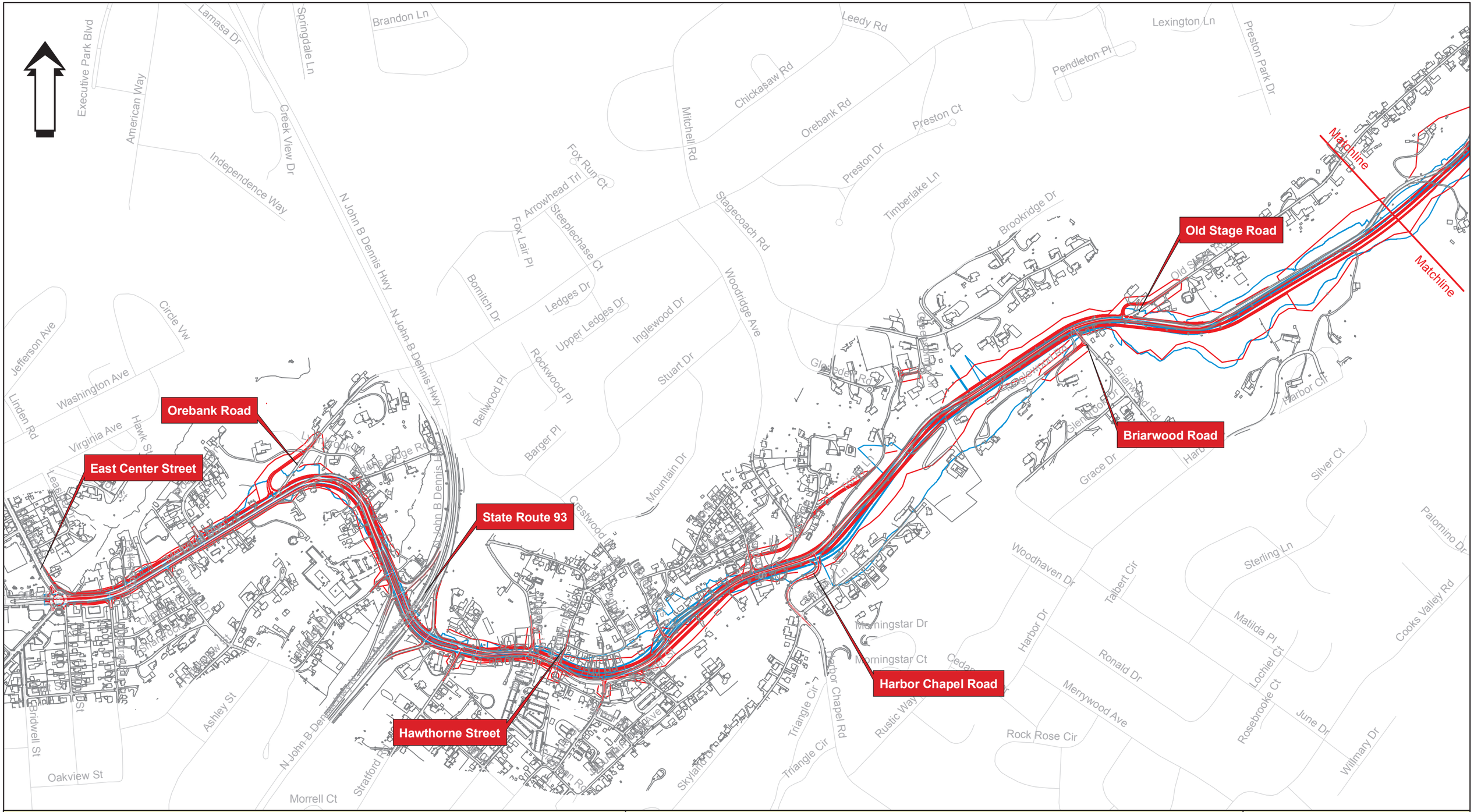
Alternative B would remain a three lane facility with a 45 mph design speed until it approaches Harrtown Road. At this point it would become a two-lane roadway until approaching a junction with Carolina Pottery Road and its intersection with I-81. In this area, it joins the existing four-lane configuration. The 45 miles-per-hour design speed is maintained until the project ends at I-81.

3.3 Design Features

The project would feature sections of four-, three- and two-lanes for traffic. It would also include sections that are urban roadways featuring sidewalks, curbs, and gutters. Other sections include rural features including wider lanes and paved shoulders. Table 3.3.1 compares the design features of the urban and rural sections of the proposed project.

Table 3.3.1 - Design Features

Design Feature	Urban Section	Rural Section
Roundabout	Yes	No
Driving Lanes	Varies 2 to 4 lanes @ 11 feet each	Varies at 2 to 4 lanes @ 11 to 12 feet each.
Shoulders	4 foot shoulders	Varies from 8 feet to 10 feet combined.
Curbs and Gutters	Yes	No
Median	Alternates between raised landscape median and 11 foot center turn lane	Only featured at area between Yancey's Tavern and East Lawn Cemetery
Retaining Walls	No	Only featured at area between Yancey's Tavern and East Lawn Cemetery
Maximum Grade	5%	7%
Access to Facility	Median openings as appropriate to various roads	Full Control
Design Speed	35 miles per hour	45 miles per hour



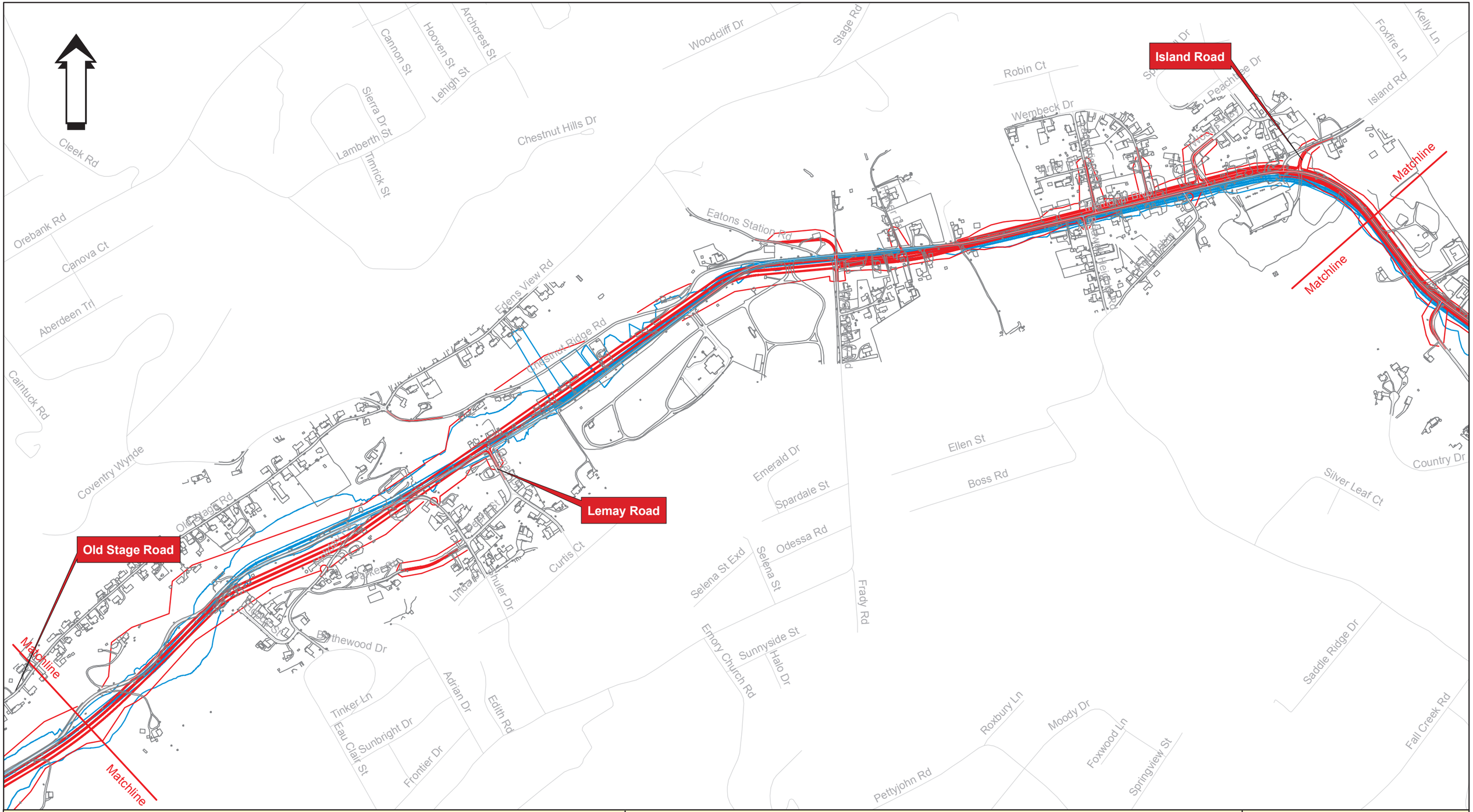
Legend

- Alternative A
- Alternative B

Figure 2.1
Project Overview
State Route 126
Sullivan County, Tennessee

0 500 1,000 2,000 3,000 4,000 Feet

Alternatives A & B with Road Segments



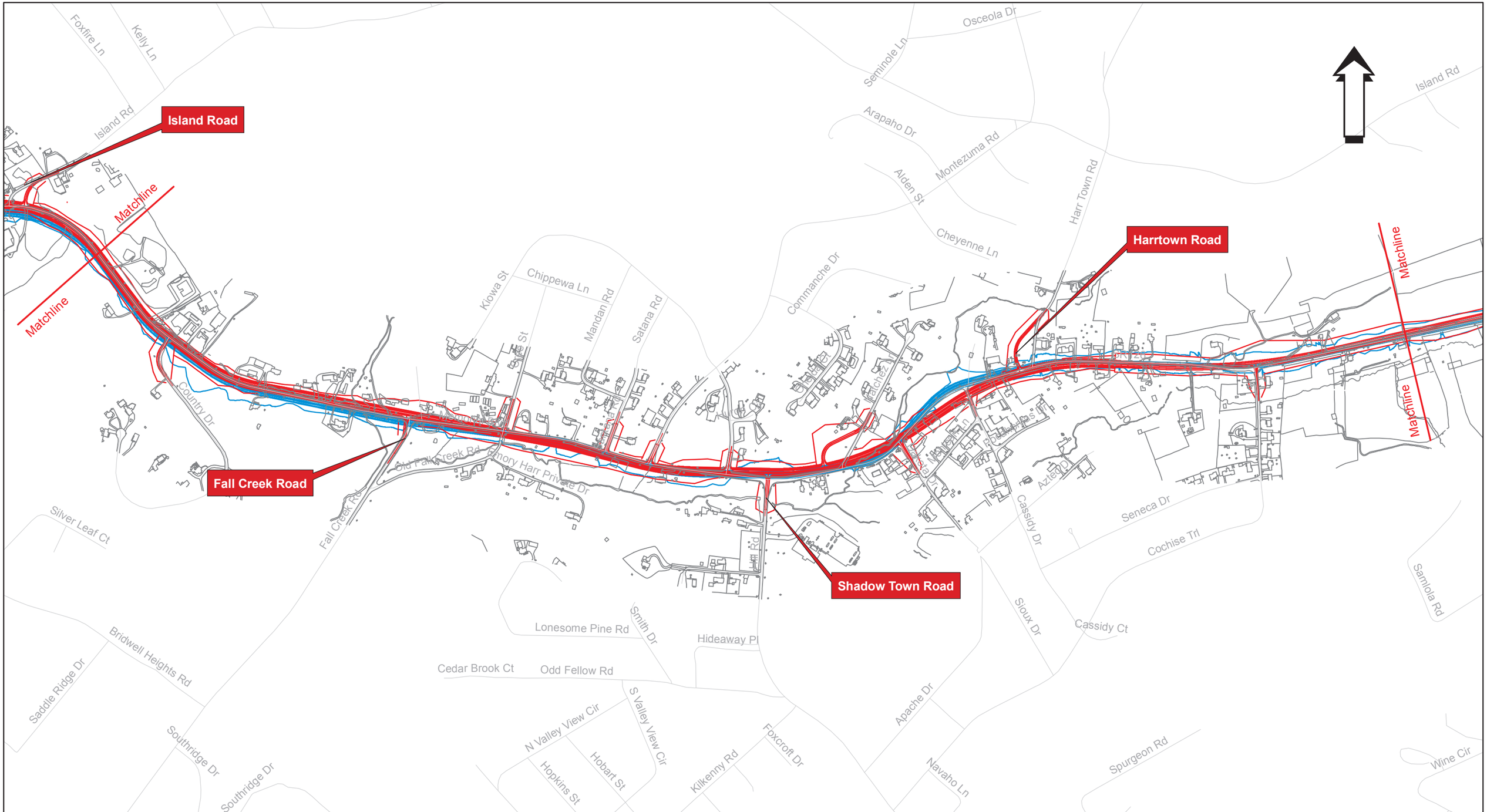
Legend

- Alternative A
- Alternative B

Figure 2.1
Project Overview
State Route 126
Sullivan County, Tennessee

0 500 1,000 2,000 3,000 4,000 Feet

Alternatives A & B with Road Segments



Legend

- Alternative A
- Alternative B

Figure 2.1
Project Overview
State Route 126
Sullivan County, Tennessee

0 500 1,000 2,000 3,000 4,000 Feet

Alternatives A & B with Road Segments

Legend

- Alternative A
- Alternative B

Figure 2.1
Project Overview
State Route 126
Sullivan County, Tennessee

0 500 1,000 2,000 3,000 4,000 Feet

Alternatives A & B with Road Segments

4. Highway Traffic Noise Analysis

4.1. Identification of Noise Receiver Sites

In selecting the noise receiver sites, an effort was made to develop an accurate appraisal of the entire project corridor with respect to the noise receivers. Measured (2008) noise levels were compared to modeled noise levels that utilized projected 2033 build and 2033 no-build traffic for 24 receivers, representing 159 additional receivers. The number of receivers represented at each site was determined by counting the receivers that were approximately the same distance from the ROW boundary as the analyzed receiver. The analyzed receiver was always the one nearest the proposed alternative. The number of represented receivers for each receiver is given in Table 4.2.1 on page 11.

Federal guidance for handling noise impacts and abatement are contained in 23 Code of Federal Regulations (CFR) Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise." Activity Category B (picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals) is applicable to the receptors on this project. For Category B, the Noise Abatement Criteria (NAC) is 67 dBA. Table 4.1.1 provides description of the land use categories.

Table 4.1.1 - FHWA Noise Abatement Criteria Hourly A-Weighted Sound Levels*

Land Use Category	L_{eq}	Description
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (Exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 (Exterior)	Developed lands, properties, or activities not included in categories A and B above.
D	---	Undeveloped lands.
E	52 (Interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

***Source:FHWA, 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, FHWA, USDOT, April 1992**

4.2. Existing and Predicted Noise Levels

Field measurements were taken at representative sites throughout the SR 126 project area, located at or near existing areas of human use. These measurements were made at varying times. In accordance with TDOT's Noise Policy and Federal Regulations contained in 23 CFR 772, existing noise levels were taken at times that represented "worst hour" noise levels. Based on observations of traffic patterns in the project area, worst hour levels were determined to be from 7:30am – 10:30am, 3:00pm – 6:00pm (commuting times) and from 11:30am – 1:30pm (traditional lunch hour traffic).

Receptors where the predominant existing noise source was not SR 126 were considered "ambient" receivers and may have had existing readings taken outside these peak travel times. Field measurements were conducted for all of the sites during clear, dry weather conditions. The existing (ambient) noise levels were documented to establish baseline conditions to compare with the future build and no build conditions.

Ambient Noise levels for the receivers were measured on April 30, March 20 and 21, and May 11, 2008 during meteorologically acceptable periods. Measurements were conducted utilizing a Rion Model NL-20 Type II sound level meter that was set to update Leq (in dBA) ten times per second. Readings were taken for two, ten-minute periods and averaged.

Traffic noise level predictions for the build alternatives were made for the year 2033 using the FHWA Traffic Noise Model version 2.5 (TNM 2.5) computer model (FHWA Highway Traffic Noise Prediction Model, Report No. FHWA-PD-96-010). The model incorporates the design alternatives, as well as existing area roads that were determined to contribute appreciably to the existing and future noise levels. The 2033 No Build Alternative noise levels will increase from the existing noise levels due to additional traffic volumes in future years. The future No Build levels were estimated based on future traffic projections. East of Old Stage Road, future traffic volumes are approximately 20% higher than existing volumes. This would increase No Build levels 1 dBA over existing levels at receivers in this area (receivers 1-6, 23 and 24). West of Old Stage road, traffic volumes are predicted to approximately double, increasing No-Build levels by 3 dBA over existing levels (receivers 7-22). Noise Receiver Locations, and Existing and Predicted Noise Levels are indicated in Table 4.2.1, on the following page. The receivers exhibiting a highway traffic noise impact from one, or both, alternatives are highlighted in red. Figure 4.2.1, on page 12, provides location and existing and future noise levels of the noise receivers in the project area.

Table 4.2.1 - Noise Receivers with Existing and Predicted Noise Levels (dBA) [a]

Site ID	NAC Category	Number of Represented Receivers	2008 Existing	2033 Alternative A	2033 Alternative B	2033 No Build	Difference Between Existing and Build A|B		Distance to EOP* Existing (ft)	Distance to Nearest EOP* Build (ft)
1	B	6	63.2	65	65	64	2	2	34	36
2	B	10	60.1	65	65	61	5	5	77	30
3	B	7	63.0	66	66	64	3	3	92	90
4	B	10	73.1	70	69	74	-3	-4	40	23
5	B	5	57.2	66	64	60	9	7	205	140
6	B	12	58.9	64	67	60	5	8	181	78
7	B	14	43.8	57	57	47	13	13	375	380
8	B	14	43.6	55	55	47	11	11	420	421
9	B	8	61.2	64	62	64	3	1	96	79
10	B	4	57.8	64	64	61	6	6	152	124
11	B	5	58.2	62	61	61	4	3	289	286
12	B	6	54.9	60	60	58	5	5	280	256
13	B	9	60.2	66	66	63	6	6	94	68
14	B	4	69.9	66	68	73	-4	-2	44	35
15	B	2	65.2	66	67	68	1	2	43	51
16	B	6	62.4	68	66	65	6	4	67	35
17	B	7	55.3	69	65	58	14	10	103	64
18	B	8	67.1	68	65	70	1	-2	58	72
19	B	15	65.2	68	67	68	3	2	43	50
20	B	6	48.9	62	59	52	13	10	285	168
21	B	3	52.4	61	60	55	9	8	270	192
22	B	8	60.1	64	63	63	4	3	98	97
23	B	6	60.3	63	63	61	3	3	150	170
24	B	8	65.9	65	64	67	-1	-2	61	51

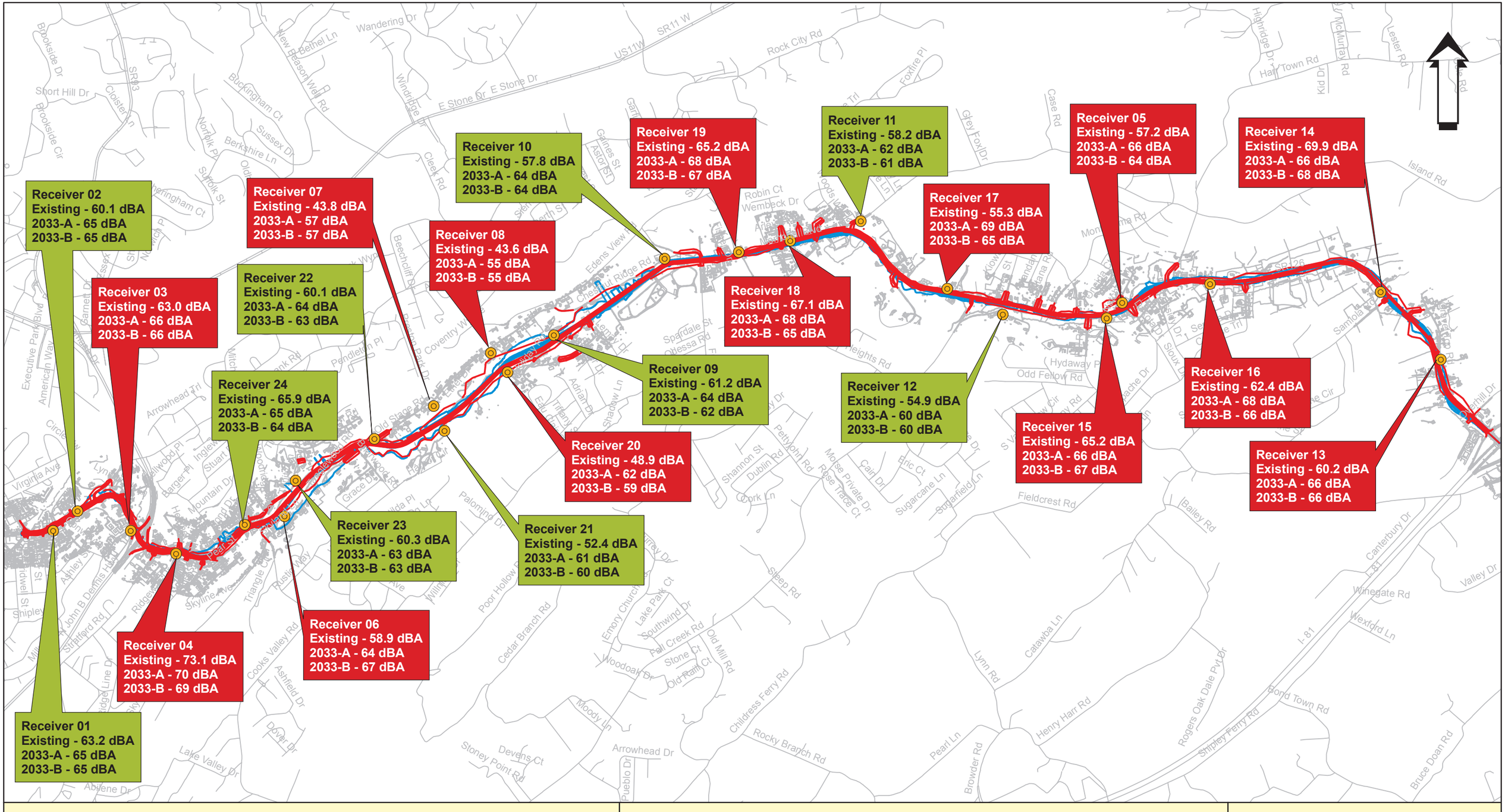
[a] The noise abatement criterion is 67 for all receivers.

4.3. Noise Impacts

In accordance with 23 CFR Part 772, the Federal Highway Administration (FHWA) Noise Abatement Criteria and the Tennessee Department of Transportation Traffic Noise Analysis and Abatement Policy and Guidance manual, the following criteria are utilized in determining the occurrence of traffic noise impacts:

1. When the predicted design year noise levels approach (defined as within one dBA) or exceed those values shown for the appropriate activity category of the NAC.

2. When the predicted design year noise levels "substantially exceed existing noise levels" (as defined), by 10 dBA or more.



Legend

- Alternative A
- Alternative B
- Noise Receivers
- No Noise Impact
- Noise Impact

Figure 4.2.1
Highway Traffic Noise Analysis
Noise Receiver Locations and
Existing and Predicted Noise Levels

0 1,600 3,200 6,400 9,600 12,800 Feet

Sullivan County
SR 126
Alternatives A and B

4.3.1 Alternatives Impact Summary

Alternative A would impact 13 receivers, representing 107 residential properties. Alternative B would impact 12 receivers, representing 106 residential properties.

No Build levels will increase due to increased traffic volumes in 2033. West of Old Stage Road the future traffic volumes are predicted to be approximately 20% higher than existing levels. Due to this traffic increase, receivers west of Old Stage Road will see a future noise level increase of 1 dBA for the No Build Alternative. East of Old Stage Road the future traffic volumes are predicted to approximately double the existing levels. Receivers east of Old Stage Road will see a future noise level increase of 3 dBA for the No Build Alternative.

Receivers 4, 14, 18 and 24 already have existing levels that are above the NAC. Receivers 15 and 19 would have future No Build levels that would be above the NAC.

Due to build alternative shifts from the existing, the new road will be further away from some noise receivers. These receivers have future levels that are predicted to be lower than the existing or No Build noise levels.

4.4. Noise Abatement Measures

4.4.1 Reasonableness/Feasibility for Barrier Abatement

The construction of noise barriers for the impacted receivers along SR 126 is not feasible due to the numerous access points along the existing and proposed facility. These points provide access to residences and businesses along SR 126. Any constructed noise barrier would require gaps to maintain access, greatly reducing the noise reduction and cost-effectiveness of the noise barrier. For this reason, it is generally considered infeasible to construct a noise barrier on a portion of a roadway where access is necessary.

4.4.2 Alternative Abatement Measures

Alternatives to noise barrier construction were considered at the impacted receivers for Build Alternatives A and B, including:

- Traffic management measures (primarily restrictions on truck use) – The project is designed to be an urban minor arterial. Prohibiting or restricting usage of this facility by trucks or other vehicles was not considered to be practical and, therefore, was determined to be not reasonable as a method for mitigating highway traffic noise impacts.
- Alteration of horizontal and vertical alignments – The horizontal and vertical alignments of the build alternatives have been optimized to the extent practicable to minimize environmental impacts, while utilizing the existing facility location. Altering the horizontal and vertical alignment of the build alternatives to mitigate noise impacts was determined to be not reasonable.
- Acquisition of property (buffer zone) – Acquisition of property adjacent to the project for a buffer zone would result in acquisition of the residences receiving noise impacts, and would provide a buffer only for future development that would not be allowed within the buffer zone. Acquisition of property as a method for mitigating highway traffic noise impacts was determined to be not reasonable.
- Insulation of public buildings to meet interior standards – There were no public buildings identified as receiving noise impacts.

5. Construction Noise

Noise levels in the project area will be increased during construction. The sound levels resulting from construction activities at nearby noise-sensitive receivers will be a function of the types of equipment utilized, the duration of the activities, and the distances between construction activities and nearby land uses.

It is expected that TDOT's construction specifications will apply to this project. As a result, construction procedures shall be governed by the Standard Specifications for Road and Bridge Construction as issued by TDOT and as amended by the most recent applicable supplements. The contractor will be bound by Section 107.01 of the Standard Specifications to observe any noise ordinance in effect within the project limits. Detoured traffic shall be routed during construction so as to cause the least practicable noise impact upon noise-sensitive areas.

6. Noise Compatible Land Use Planning

TDOT encourages local communities and developers to practice noise compatible land use planning in order to avoid future noise impacts. The following language is included in TDOT's noise policy:

"Highway traffic noise should be reduced through a program of shared responsibility. Local governments should use their power to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway or that the developments are planned, designed and constructed in such a way that noise impacts are minimized."

Two guidance documents on noise compatible land use planning are available from FHWA.[a, b]

Table 6.1 presents predicted design year 2033 sound levels for areas near the project where vacant and possibly developable lands exist. These values do not represent predicted levels at every location at a particular distance back from the roadway. Sound levels will vary by location and will be affected by the shielding of terrain features such as hills and the shielding by objects such as buildings.

Table 6.1 - Sound Levels for Undeveloped Lands

Distance (in feet)(1)	Leq (1h) (dBA)(2)
50	69
100	66
250	61
500	60

(1) Perpendicular distance to the center of near lane.
(2) At-grade situation.

This information is being included to make local officials and planners aware of anticipated highway noise levels so that future development will be compatible with these levels.

As mentioned previously, TDOT's noise policy states that "noise abatement will also not be considered reasonable for land uses constructed after the date of adoption of this noise policy (based upon local Assessor's records), except for projects involving construction of a roadway on a new alignment."

TDOT's noise policy was adopted in April, 2005. Development constructed after this date will not be eligible for noise abatement for future projects.

Finally, TDOT currently has an active Type II Noise Barrier Program to facilitate the construction of "retrofit" noise barriers along existing highways. To be eligible for a Type II noise barrier, an area must meet the following criteria:

- The neighborhood must be located along a limited-access roadway;
- The neighborhood must be primarily residential;
- The majority (more than 50%) of residences in the neighborhood near the highway pre-dated the initial highway construction;
- A noise barrier for the neighborhood must not have been previously determined to be not reasonable or not feasible as part of a new highway construction or through-lane widening study (Type I project);
- Existing noise levels measured in the neighborhood must be above the Noise Abatement Criteria (NAC) of 66 dBA;
- A barrier must be feasible to construct and will provide substantial noise reduction; and,
- A barrier must be reasonable (barrier cost per benefitted residence) in accordance with TDOT's noise policy. A residence is considered "benefitted" if the noise barrier will reduce the traffic noise by at least 5 dB.

a. The Audible Landscape: A Manual for Highway Noise and Land Use, FHWA, November, 1974. http://www.fhwa.dot.gov/environment/audible/index.htm
b. Entering the Quiet Zone: Noise Compatibility Land Use Planning, FHWA, May, 2002. http://www.fhwa.dot.gov/environment/noise/quietzone

7. Noise Abatement Conclusions

Based on the above considerations and analysis, noise abatement measures are not considered reasonable at the sites studied and are not recommended for this project.

8. Mobile Source Air Quality Analysis

8.1. Air Quality Impacts

SR 126 in Sullivan County is an attainment area according to EPA levels set for criteria mobile source air pollutants. The project is in the Kingsport Metropolitan Planning Organization's (MPO) planned projects, and is included in the conforming 2008-2011 Transportation Improvement Program (TIP). The project is also included in Kingsport MPO Draft 2011-2014 TIP, in Section A, which lists projects included in the previous TIP.

8.1.1. Carbon Monoxide

Based upon the analysis of highway projects with similar meteorological conditions and traffic volumes, the carbon monoxide levels of the subject project will be well below the National Ambient Air Quality Standard (35ppm one-hour and 9ppm eight-hour). Since the project will have levels below this standard and is located in a region of air quality conformity, it was determined that there will be no CO impact on the air quality of the area from the proposed project.

8.1.2. Mobile Source Air Toxics (MSAT)

Mobile Source Air Toxics are fully addressed in Appendix D. Air quality conformity status is not projected to be altered by the proposed SR 126 project. This project qualifies as a "project with low potential MSAT effects" in accordance with FHWA's guidance.

The purpose of the project is to improve safety, emergency response times, system linkage, traffic conditions, and efficiency between Kingsport at East Center Street and I-81 by constructing new lanes, widening existing lanes, and providing shoulders, as appropriate, between East Center Street and I-81. This project has been determined to generate minimal air quality impacts for CAAA criteria pollutants and has not been linked with any special MSAT concerns.

A review of potential mobile source air toxics (MSAT) impact from this project indicate that under the build alternatives in the design year (2033), the amount of MSAT emitted will be proportional to the Annual Average Daily Traffic (AADT) and vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT for the build alternatives will be slightly higher than the no-build alternative in the build and design years because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT will lead to higher MSAT emissions for the alternatives along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE6.2 model, emissions of all of the priority MSAT except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models. Because the estimated VMT under each of the

Alternatives are nearly the same it is expected there will be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases. The SR 126 project will not add substantial new capacity and therefore the facility will not generate meaningful increases in emissions of MSAT. See the MSAT discussion in Appendix D for more details, including the current state of MSAT research.

8.2. Climate Change

Climate change, also referred to as global warming, is an increase in the overall average atmospheric temperature of the earth due to the trapping of heat in the atmosphere by greenhouse gases. The primary greenhouse gas emitted by human activities in the US is carbon dioxide (CO_2), which represents approximately 85 percent of total greenhouse gas emissions.

Transportation sources contribute to global warming through the burning of petroleum-based fuel. According to the FHWA, transportation sources are responsible for approximately one-quarter of the greenhouse gas emissions in the US. Automobiles and light-duty trucks account for almost two-thirds of emissions from the transportation sector and emissions have steadily grown since 1990.

Emissions from transportation sources depend on the number of trips or miles traveled by each type of vehicle per year, which are, in turn, influenced by larger economic trends and consumer behavior. Over the long term, changes in vehicle fuel efficiency, driving behavior, and fuel type will influence the level of emissions.

Under the Clean Air Act, the EPA has the authority to establish motor vehicle emissions standards for CO_2 and other greenhouse gases although such standards have not yet been established.

FHWA is actively involved in efforts to initiate, contact, and disseminate climate-change-related research and to provide technical assistance to stakeholders. The FHWA is also involved in climate change initiatives with the USDOT Center for Climate Change and Environmental Forecasting.

Climate change and related effects are complex and global in nature. As a result, the impacts of any single transportation project cannot be effectively estimated in terms of global warming effect. However, the emissions changes due to individual projects are very small compared to global emissions.

Once standards are established and guidance for assessing the potential greenhouse gas effects of transportation projects becomes available, a more in-depth assessment rate may be possible.

9. Summary

Of the 24 identified noise receiver sites, 13 are predicted to be impacted by Alternative A and 12 are predicted to be impacted by Alternative B. Abatement considerations and mitigation for noise are not reasonable and/or feasible for the proposed project. Air quality conformity status it not projected to be altered by the proposed SR 126 project.

Appendix A
Noise Sampling Field Monitoring Data Sheets

Noise Sampling Field Monitoring Data

Rec# 01

Location (Street Address) 3213 Memorial Blvd. Time: 7:20 (AM)/PM Duration: 10 min. x2

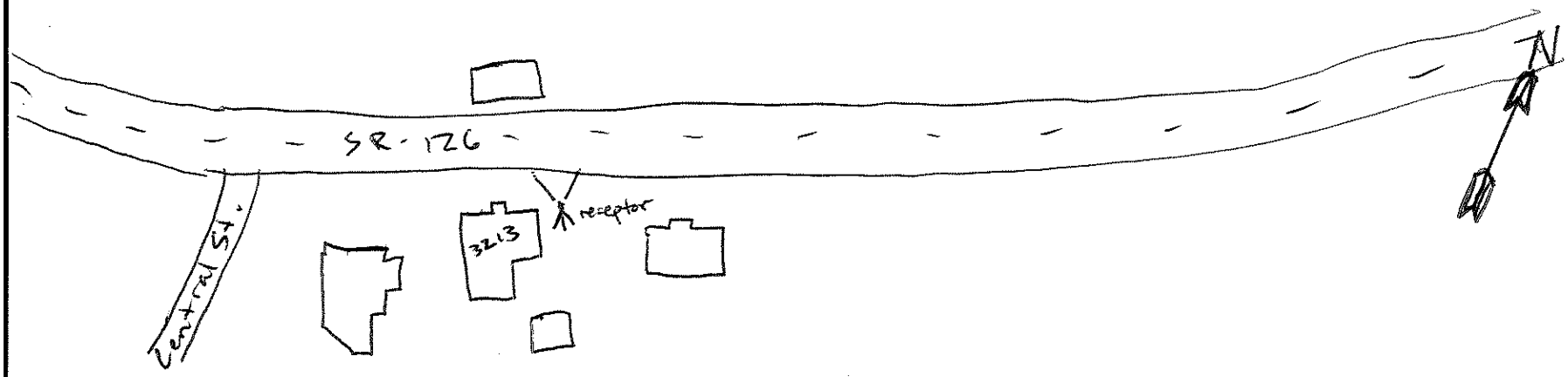
Date: 3/21/08 Temperature/Wind Speed: 9.1°C/.4mph Speed Limit 35 mph Noise Level: 63.3 dBA Leq

7:30 PM

= 63.1 dBA Leq

HMB PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

Re # 2

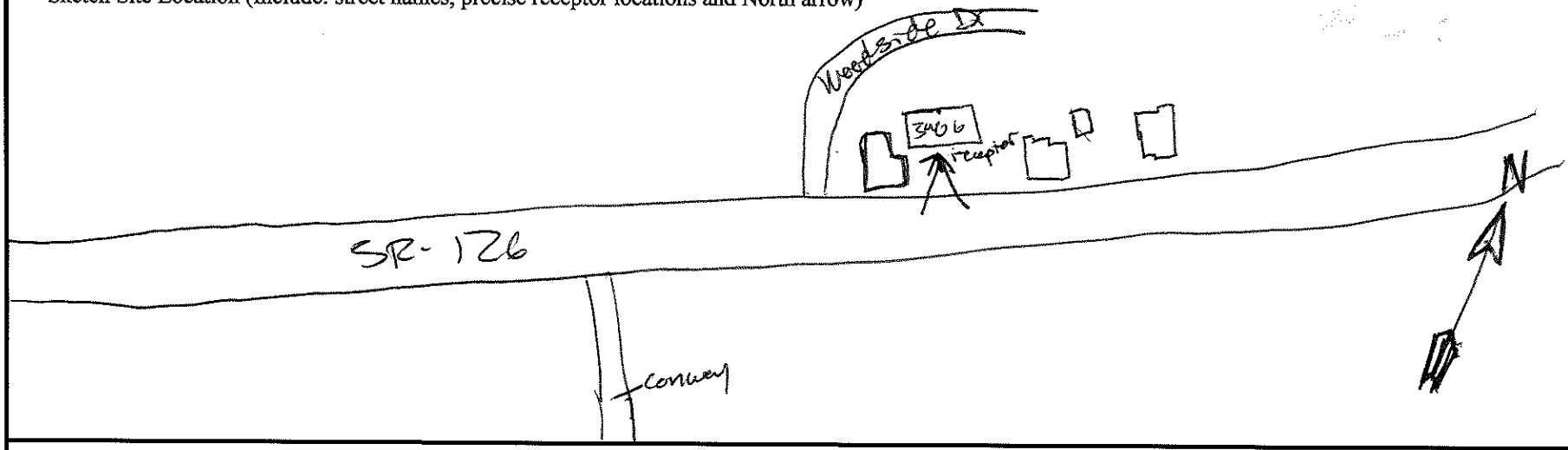
Location (Street Address) 3406 Memorial Blvd (SR-126) Time: 7:45 AM/PM Duration: 10 x 2 min. _____

Date: 3/21/08 Temperature/Wind Speed: 10.1°C/0 mph Speed Limit 35 mph Noise Level: 61.6 dBA Leq

7:55 AM

58.5 dBA Leq

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

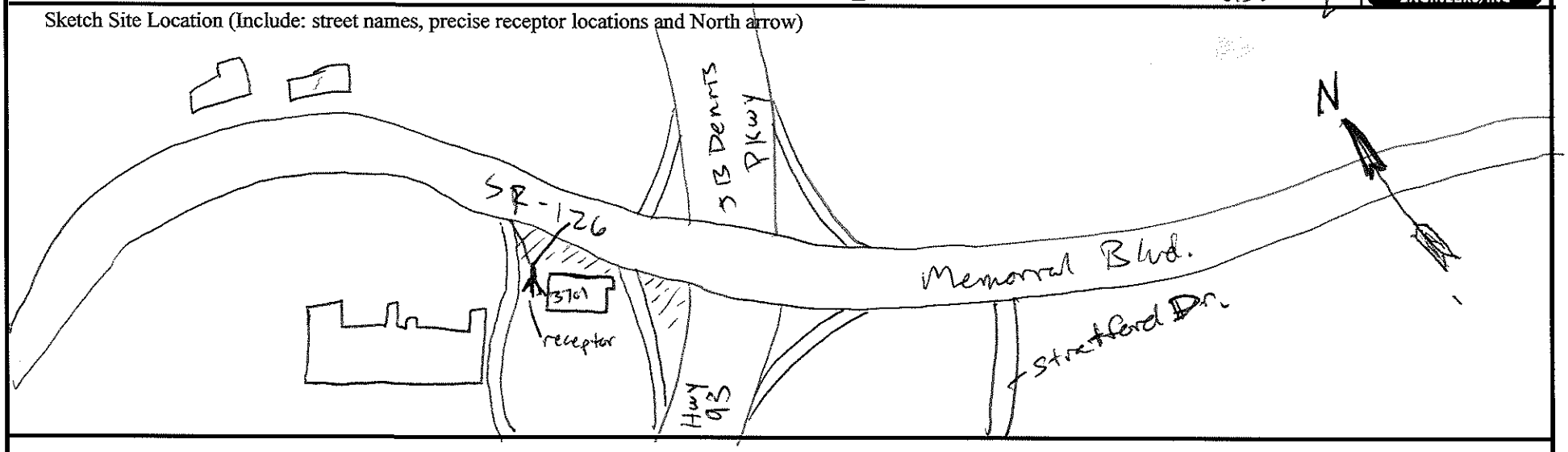
Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

REC 03

Location (Street Address) 3701 Memorial Blvd. Time: 8:10 ~~AM~~/PM (8:20 AM) Duration: 10 min. X2

Date: 3/21/08 Temperature/Wind Speed: 9.9°C/0 mph Speed Limit ~~35~~ 35 mph Noise Level: 62.8 (63.2) dBA Leq



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): Dashed lines represent slope

Noise Sampling Field Monitoring Data

Pg 1 of 4

Location (Street Address) 3821 Memorial Blvd. Time: 8:35 (AM)/PM Duration: 10 min. X7

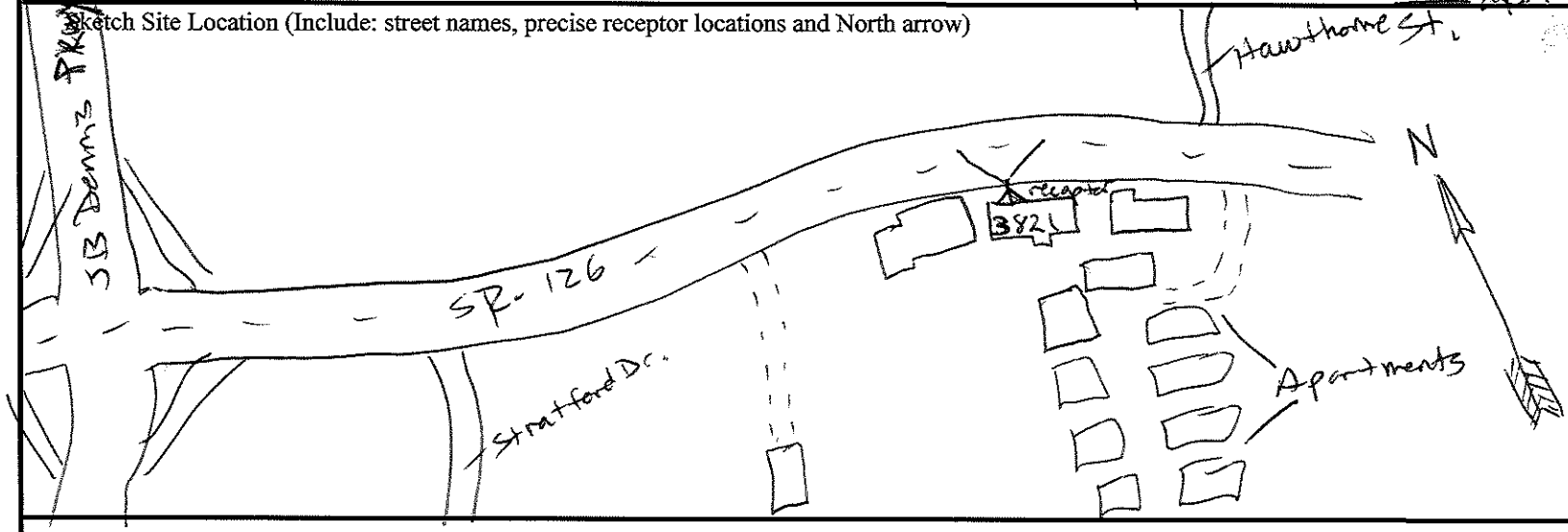
8:45 AM

Date: 3/21/08 Temperature/Wind Speed: 9.8°C/0 mph Speed Limit ~~45~~ 35 mph Noise Level: 72.7 dBA Leq

73.5 dBA Leq

PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

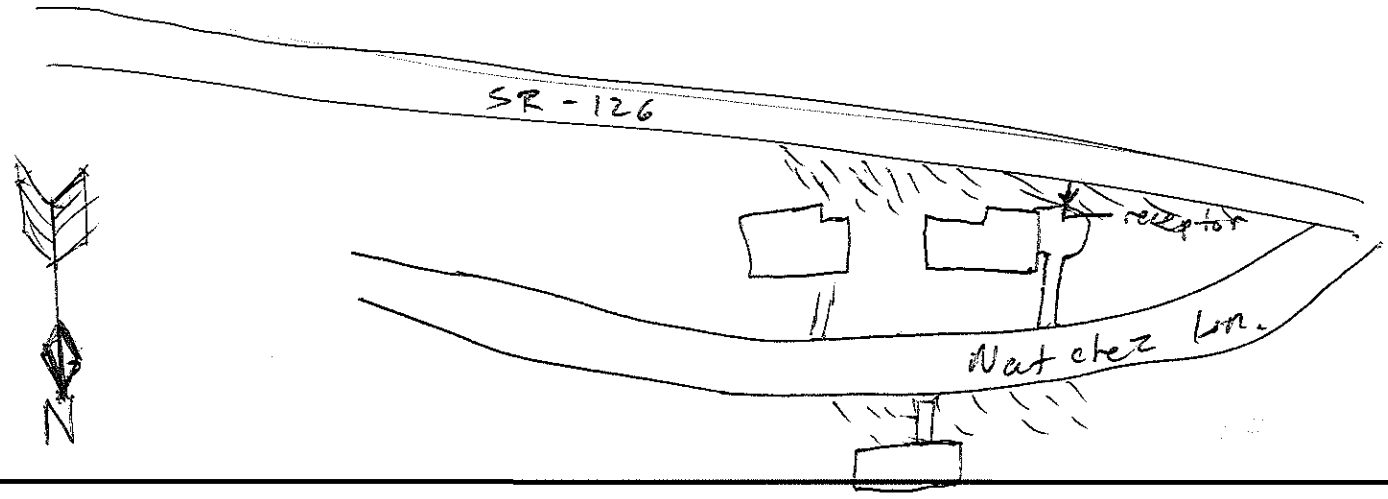
Noise Sampling Field Monitoring Data

Rec 05

Location (Street Address) 104 Natchez Cn. Time: 4:00 AM/PM 4:10 PM Duration: 10 min. x 2

Date: 4/30/08 Temperature/Wind Speed: 72°/2mph Speed Limit 50 mph Noise Level: 57.1 dBA Leq 57.3 dBA Leq

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): Dashed Lines represent slope

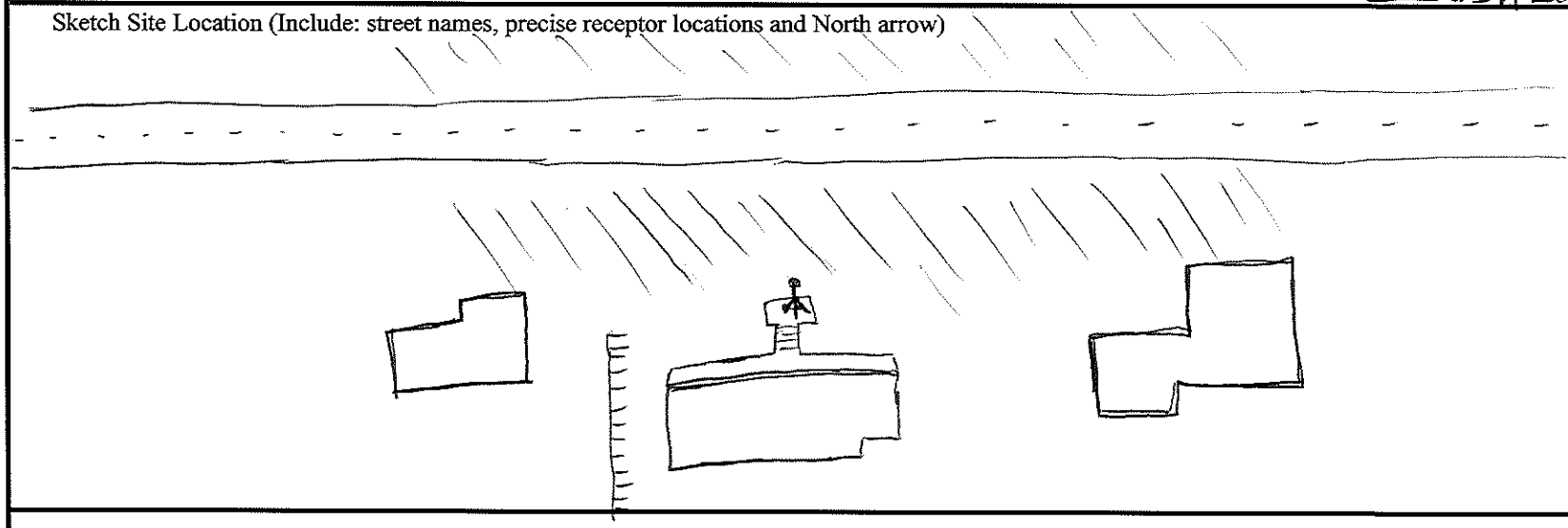
Noise Sampling Field Monitoring Data

Ex 06

Location (Street Address) 4216 SKYLAND LN. Time: 1 11:22 AM/PM Duration: 10 min. x2

Date: 3/20/08 Temperature/Wind Speed: 8.8°C/2mph 2 11:33 AM Speed Limit 45 mph Noise Level: 1 59.3 dBA Leq 2 58.5 dBA Leq

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): Dash marks represent slope.

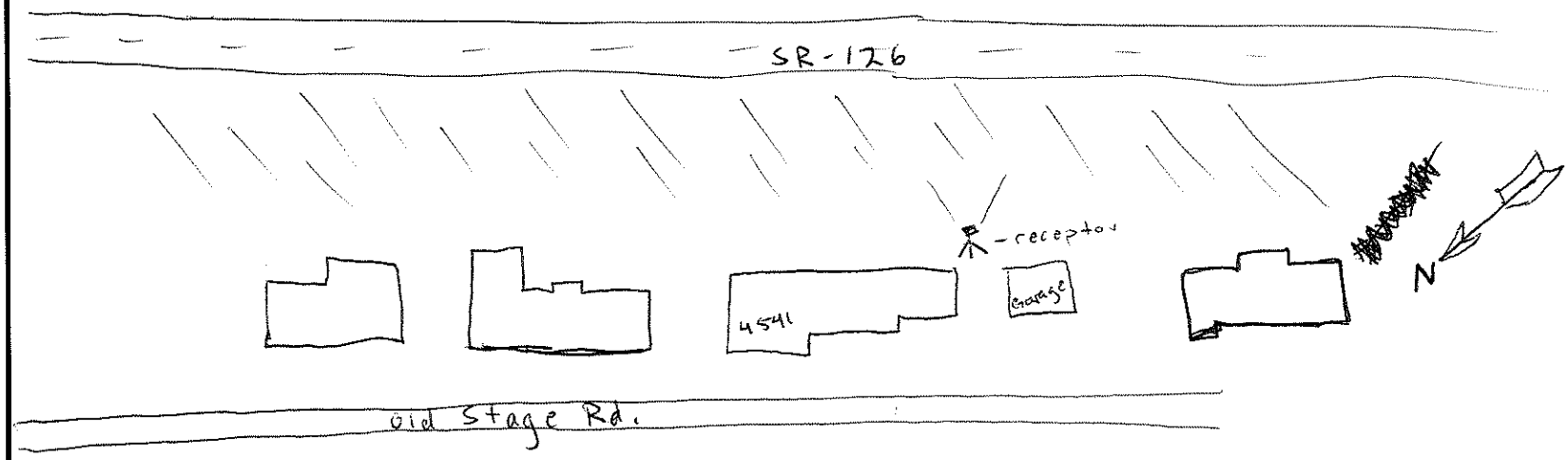
Noise Sampling Field Monitoring Data

Rz #7

Location (Street Address) 4541 Old Stage Rd. Time: 1 11:52 (AM)/PM 2 12:03 PM Duration: 10 min. x2

Date: 3/20/08 Temperature/Wind Speed: 12.8°C/1 mph Speed Limit 35 mph Noise Level: 1 43.4 dBA Leq 2 44.1 dBA Leq

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): Dash lines represent slope.

Noise Sampling Field Monitoring Data

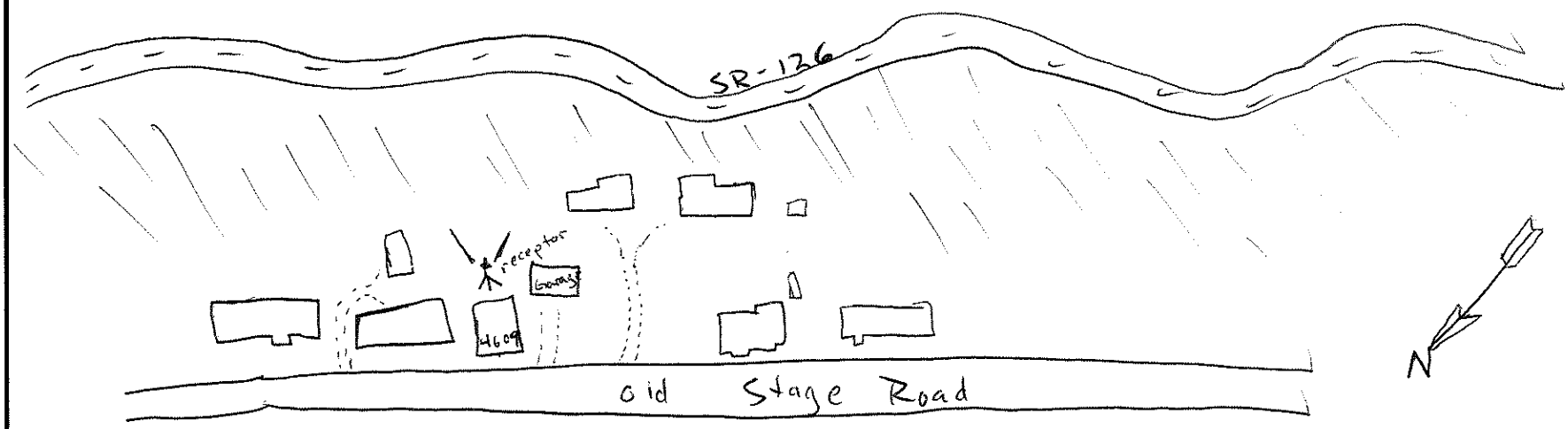
Rec 08

Location (Street Address) 4609 Old Stage Rd. Time: 12:22 AM/PM Duration: 10 min. x2

Date: 3/20/08 Temperature/Wind Speed: 16.1°C/1 mph Speed Limit 35 mph Noise Level: 44.1 dBA Leq

[2] 12:33 PM [2] 43.0 dBA Leq

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): Dash lines represent slope.

Noise Sampling Field Monitoring Data

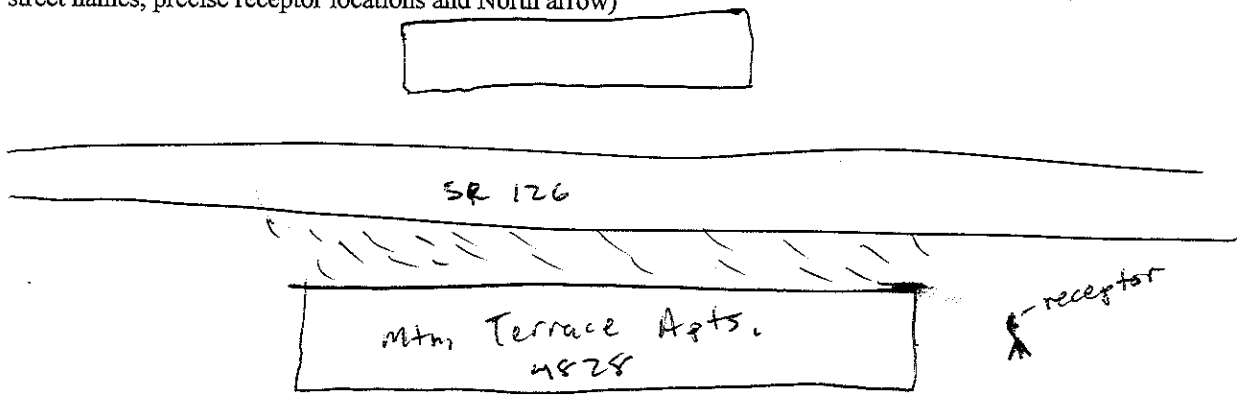
Rec #9

Location (Street Address) 4828 Memorial Blvd (126) Time: 4:35 4:45 PM AM/PM Duration: 10 min. x2

Date: 4/30/08 Temperature/Wind Speed: 72°/2mph Speed Limit 55 mph Noise Level: 61.9 dBA Leq 60.4 dBA Leq

HMB PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): Dashed Lines rep. slope

Noise Sampling Field Monitoring Data

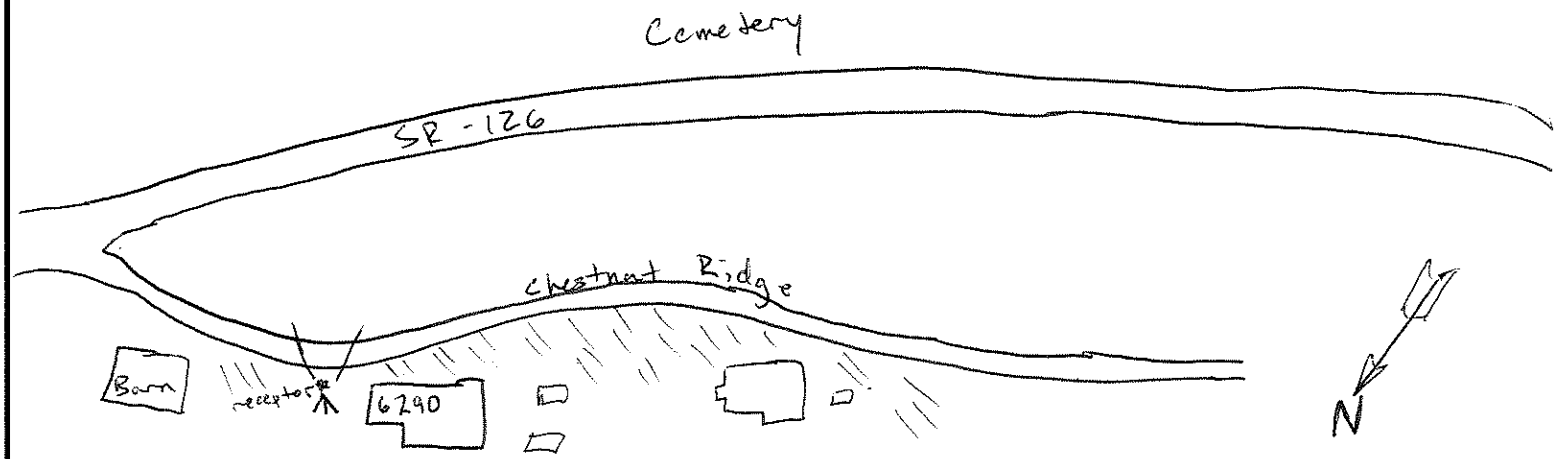
Rec 10

Location (Street Address) 6290 Chestnut Ridge Time: 12:48 AM/PM Duration: 10 min. x2

Date: 3/20/08 Temperature/Wind Speed: 16.5°C/.9 mph Speed Limit 50 mph Noise Level: 56.8 dBA Leq

[2] 12:58 PM [2] 58.7 dBA Leq

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): Dash lines represent Slope.

Noise Sampling Field Monitoring Data

RGC # 11

Location (Street Address) 143 Island Dr. Time: 1:16 AM/PM Duration: 10 min. x 2

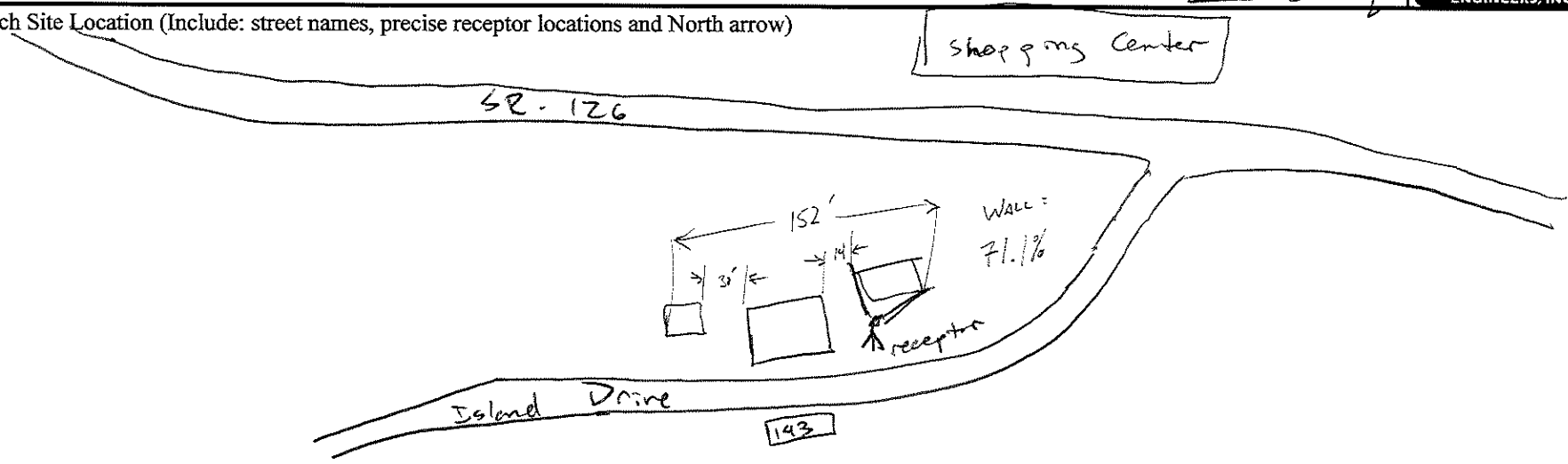
Date: 3/20/08 Temperature/Wind Speed: 13.8°C / 1.2 mph Speed Limit 50 mph Noise Level: 1 58.0 dBA Leq

2:26 PM

2 58.3 dBA Leq

PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

REC# 12

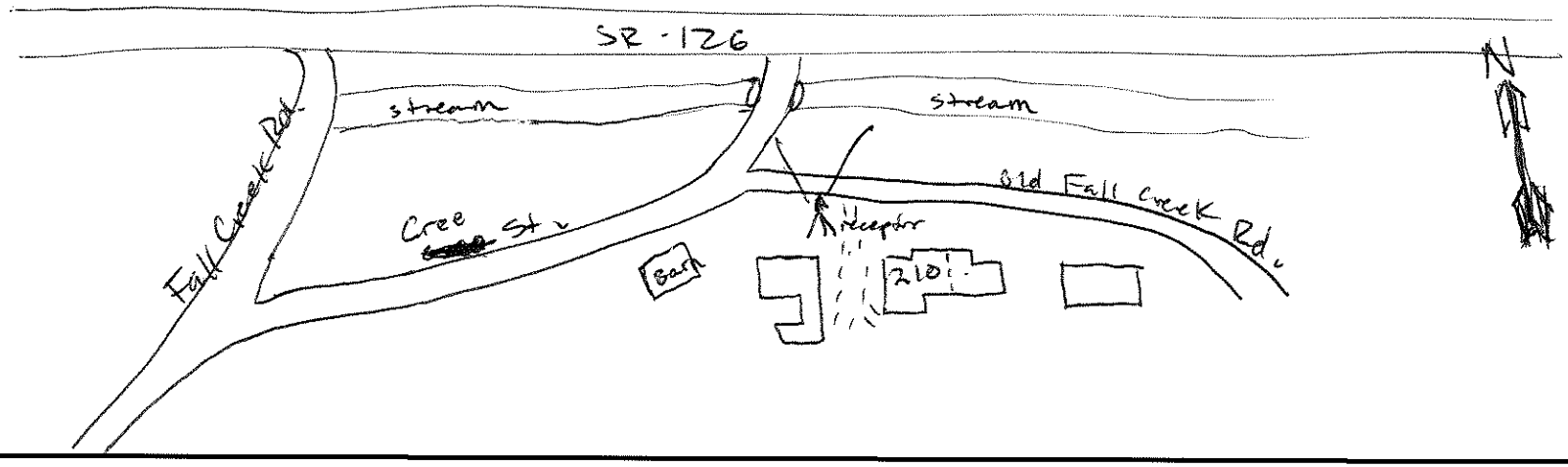
Location (Street Address) 210 Old Fall Creek Rd Time: 1:42 AM/PM Duration: 10 min. x2

Date: 3/20/08 Temperature/Wind Speed: 17.5°C / .8 mph Speed Limit 50 mph Noise Level: 54.1 dBA Leq

2:52 PM

255.7 dBA Leq

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

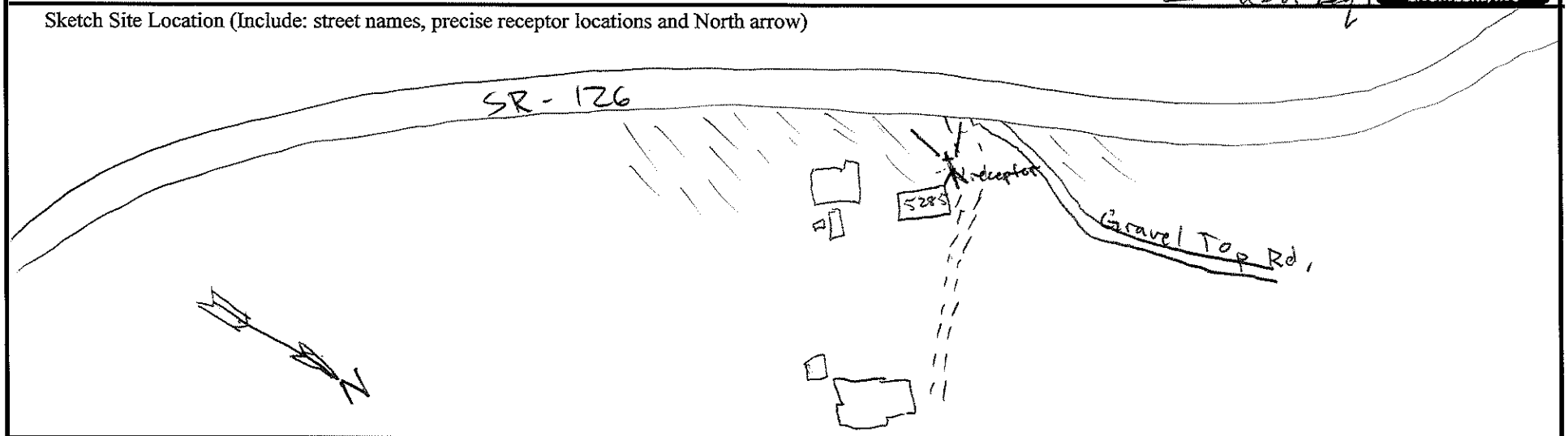
Noise Sampling Field Monitoring Data

Rec 13

Location (Street Address) 5285 Memorial (SR-126) Time: 4:14 / 24:25 AM/PM Duration: 10 min. x2

Date: 3/20/08 Temperature/Wind Speed: 7.4°C / 2 mph Speed Limit 50 mph Noise Level: 59.8 dBA Leq / 60.5 dBA Leq

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): Dashed lines represent slope

Noise Sampling Field Monitoring Data

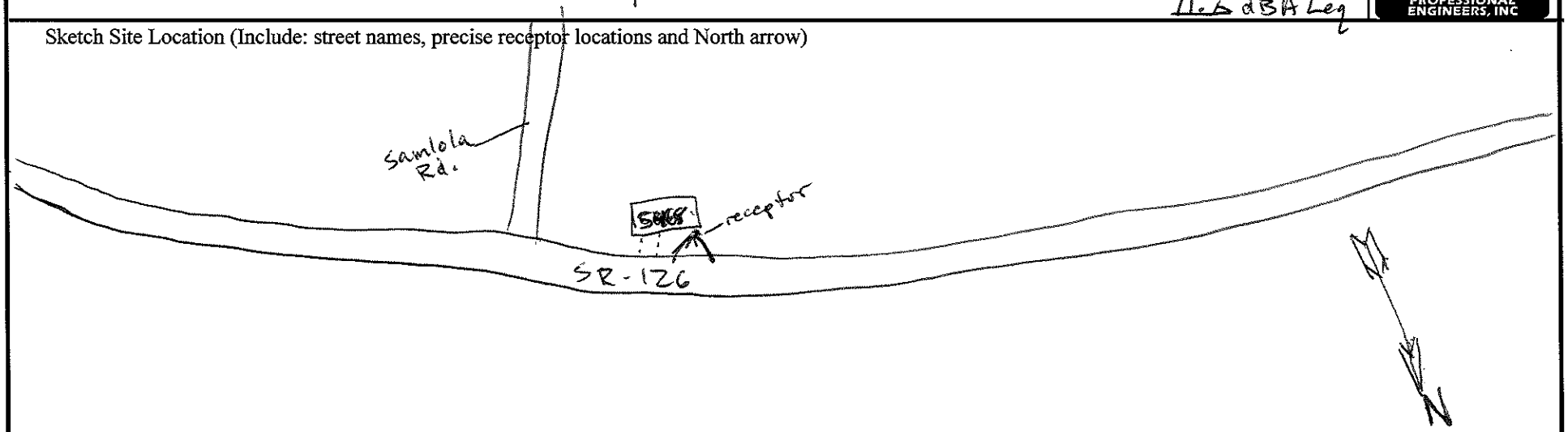
Rec 14

Location (Street Address) 5468 Memorial (SR-126) Time: 4:37 AM/PM 4:48 PM Duration: 10 min. x2

Date: 3/20/08 Temperature/Wind Speed: 15°C/1.9 mph Speed Limit 50 mph Noise Level: 68.5 dBA Leq 71.3 dBA Leq

HMB PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

Rec 15

Location (Street Address) 5680 Memorial (SR-126) Time: 5:05 AM/PM Duration: 10 min. x2

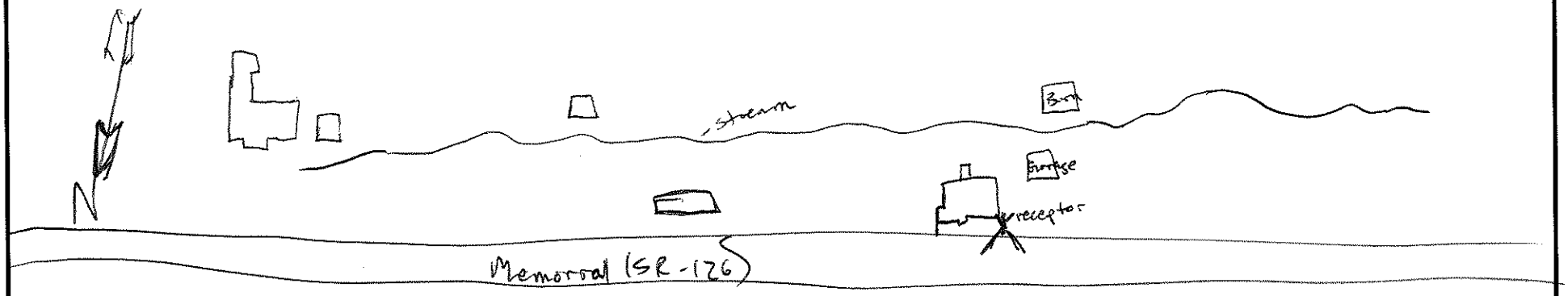
Date: 3/20/08 Temperature/Wind Speed: 16.1°C/.9 mph Speed Limit 50 mph Noise Level: 65.3 dBA Leq

2 5:15 PM

2 65.1 dBA Leq

HMB PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

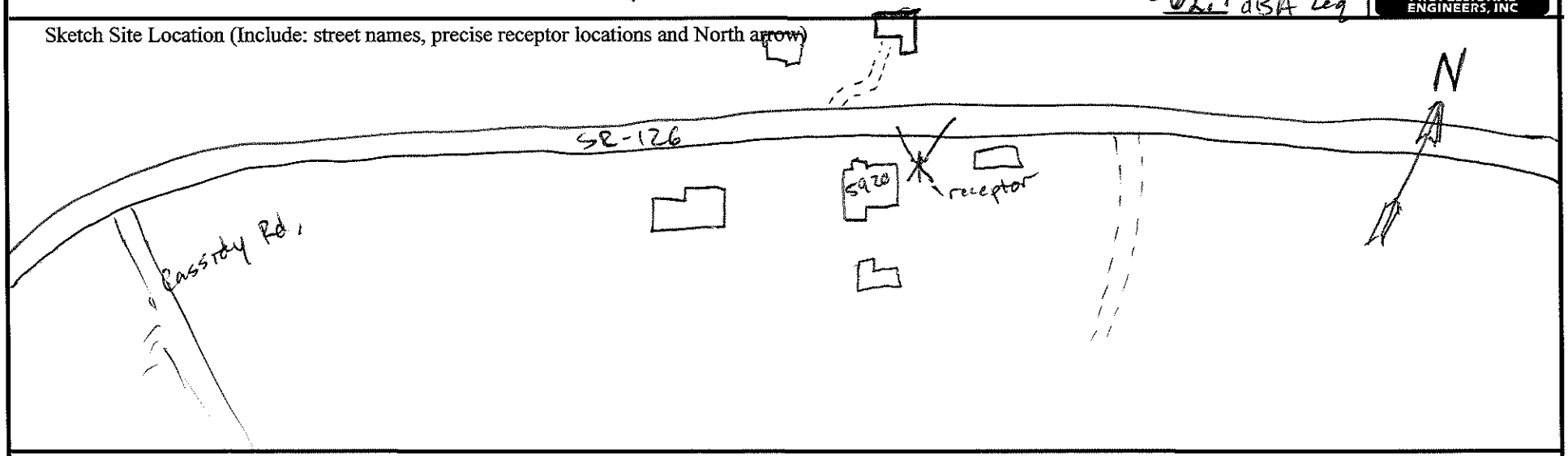
Rx 16

Location (Street Address) 5920 Memorial (SR-126) Time: [1] 5:26 AM/PM [2] 5:36 PM Duration: 10 min. x2

Date: 3/28/08 Temperature/Wind Speed: 15°C/2.0 mph Speed Limit 50 mph Noise Level: [1] 62.1 dBA Leq [2] 62.7 dBA Leq

HMB PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

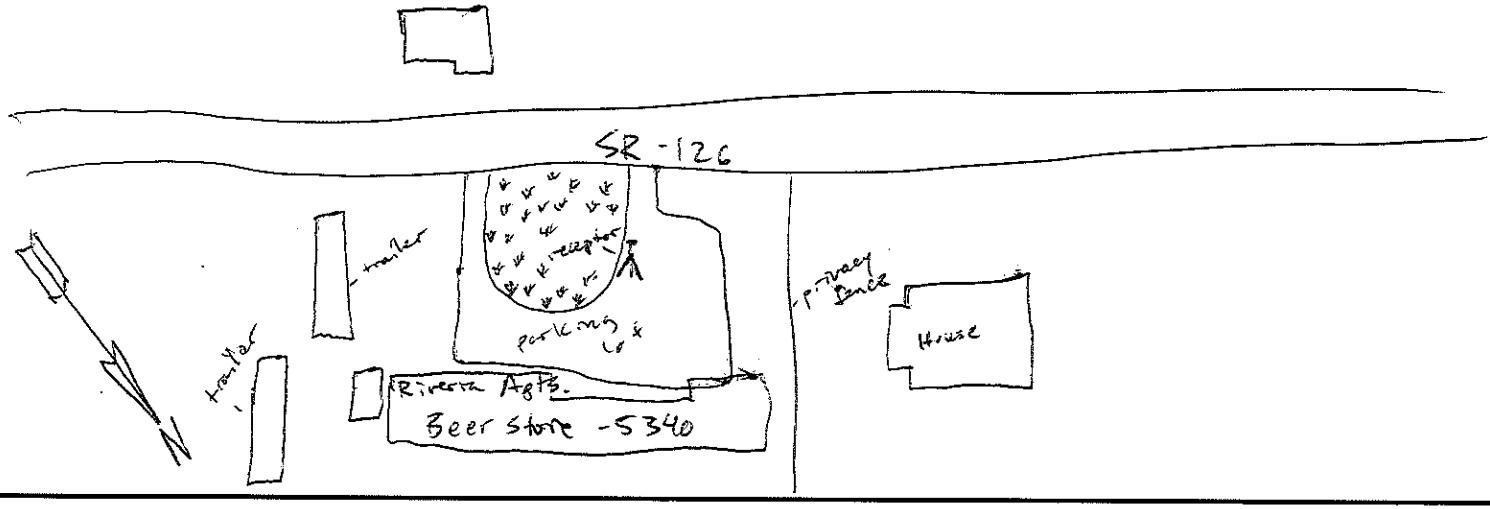
REC 17

Location (Street Address) 5340 Memorial (SR-126) Time: 8:55 (AM)/PM Duration: 10 min. x 2

Date: 5/1/08 Temperature/Wind Speed: 62°/0mph Speed Limit 55 mph Noise Level: 54.9 dBA Leq
55.6 dBA Leq

PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

Rec 18

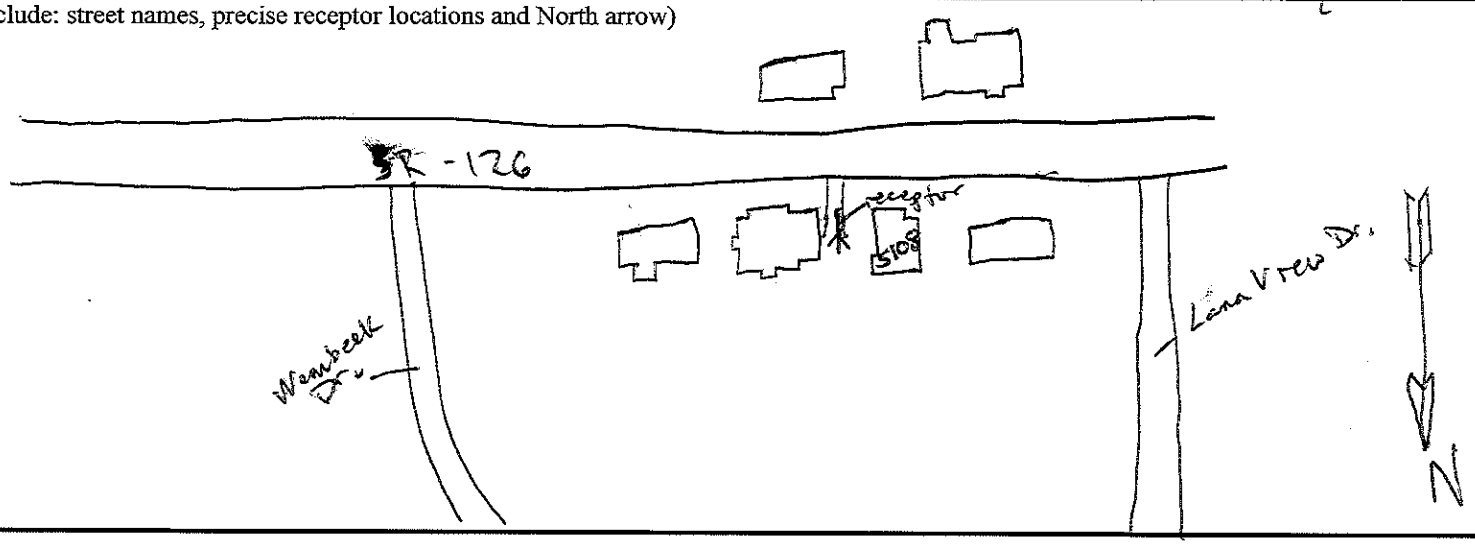
Location (Street Address) 5108 Memorial Blvd. (SR-126) Time: 9:56 (AM)/PM Duration: 10 min. x 2

Date: 5/1/08 Temperature/Wind Speed: 66/ mph Speed Limit 50 mph Noise Level: 67.5 dBA Leq

66.7 dBA Leq

PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

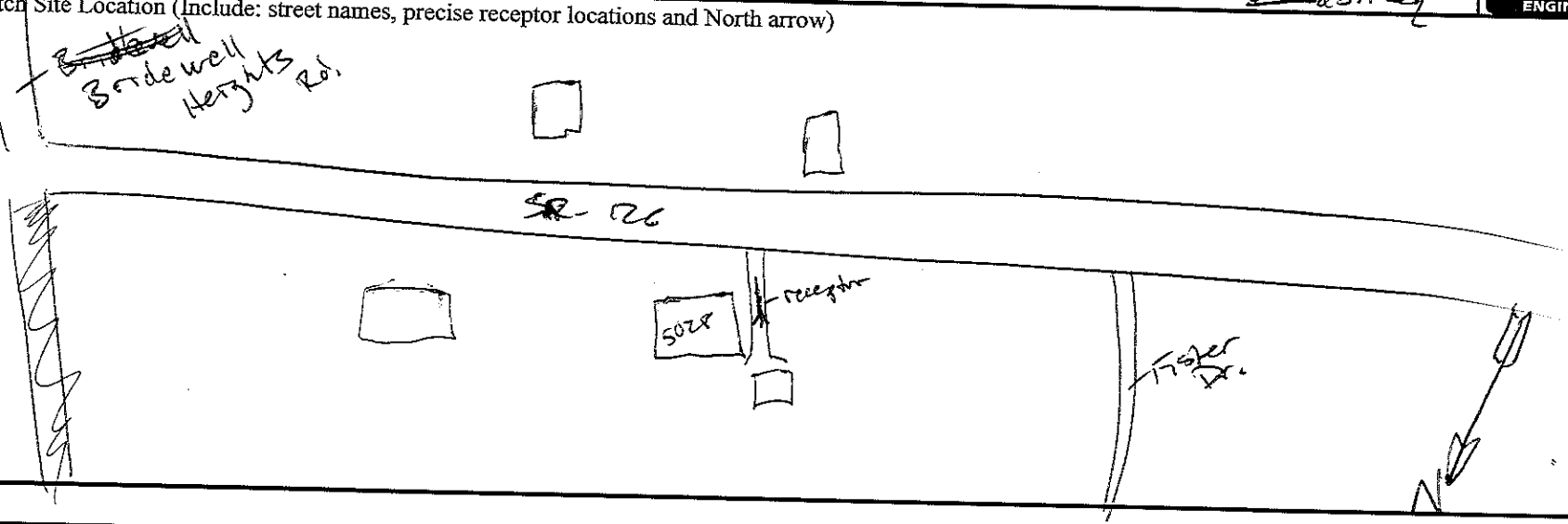
Dec 19

Location (Street Address) 5828 Memorial Blvd. (SR 126) Time: 10:30 AM/PM Duration: 10 min. x2

Date: 5/1/08 Temperature/Wind Speed: 66/ mph Speed Limit 55 mph Noise Level: 65.0 dBA Leq
65.3 dBA Leq

HMB PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

Rec 20

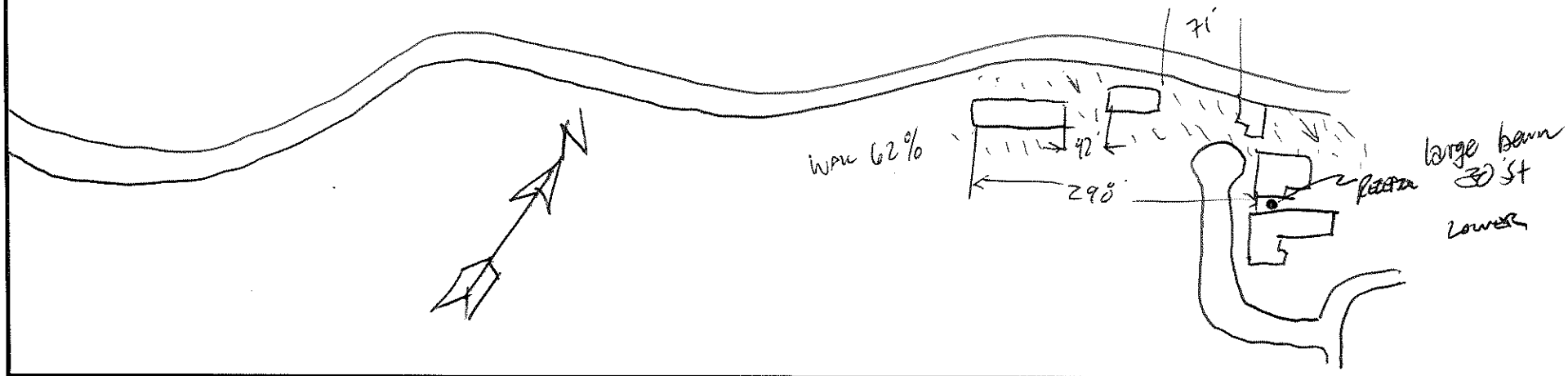
Location (Street Address) 105 Time: 10:58 AM/PM Duration: 10 min. x2

Date: 5/11/08 Temperature/Wind Speed: 68/1mph Speed Limit 50 mph Noise Level: 50.0 dBA Leq

47.8 " "

HMB PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

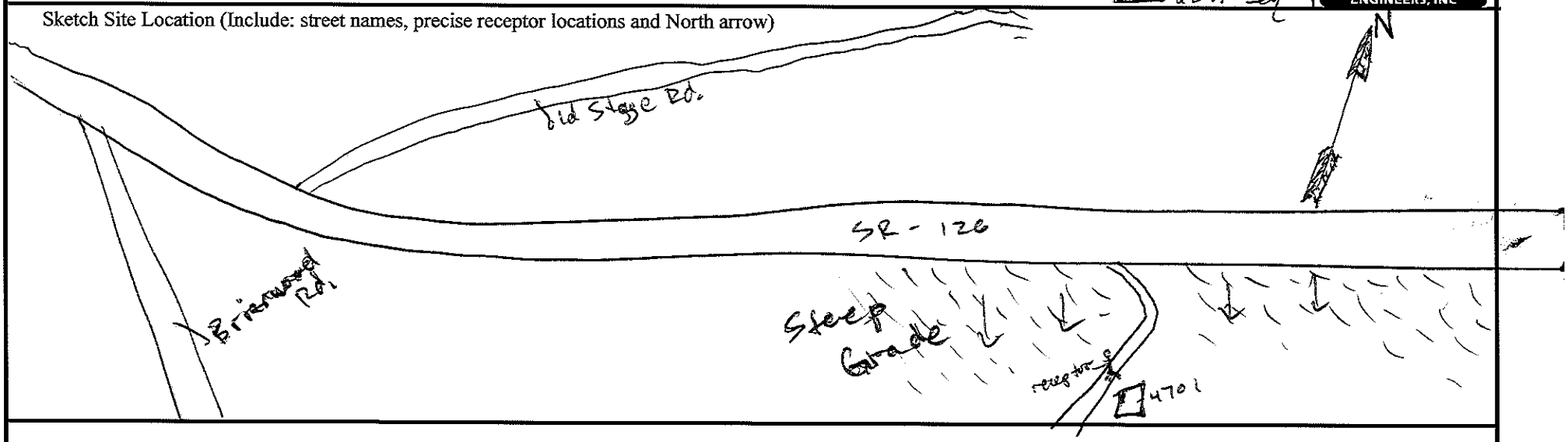
Rec 21

Location (Street Address) 4701 Memorial Blvd. (SR-126) Time: 1:28 AM/PM 1:40 PM Duration: 10 min. x2

Date: 5/1/08 Temperature/Wind Speed: 73/ mph Speed Limit 40 mph Noise Level: 49.9 dBA Leq 54.9 dBA Leq

HMB PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

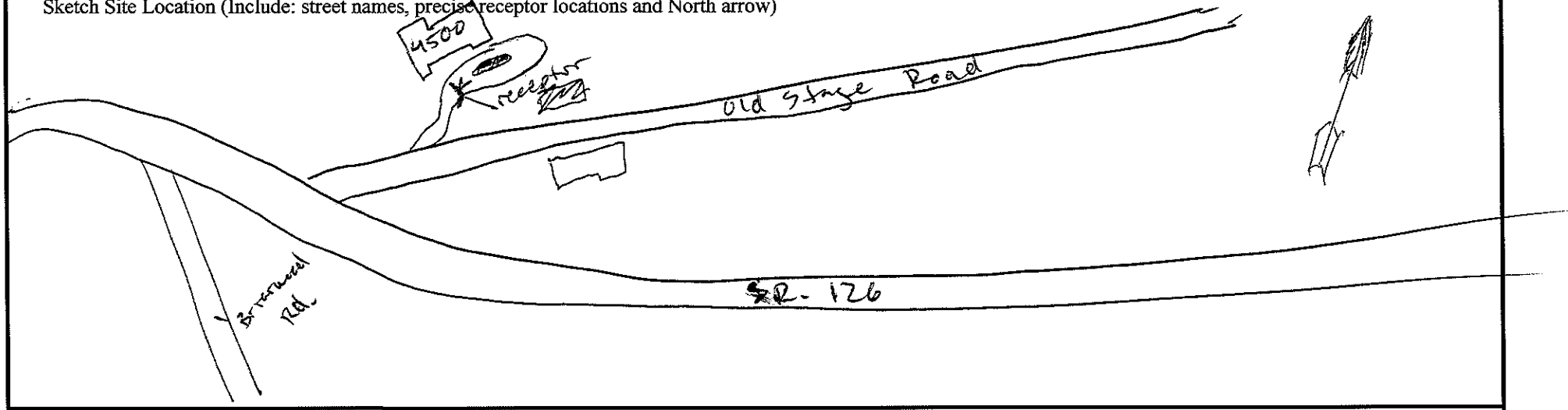
Rez 22

Location (Street Address) 4500 Old Stage Rd. Time: 1:55 AM/PM Duration: 10 min. x 2

Date: 5/1/08 Temperature/Wind Speed: 73/1 mph Speed Limit 50 mph Noise Level: 58.2dBA Leq
62.0 dBA Leq

HMB PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

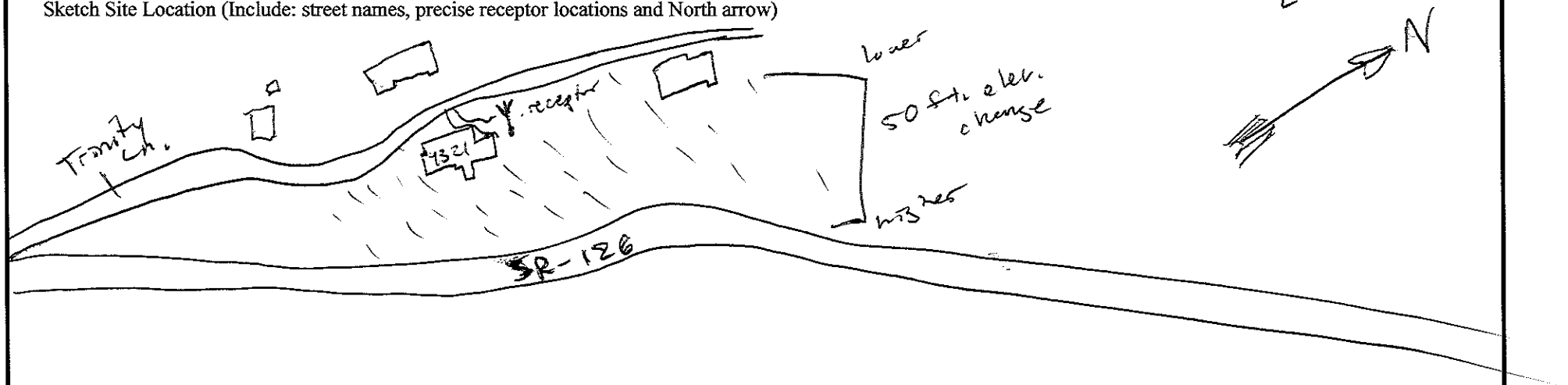
lot 23

Location (Street Address) 4321 Trinity Ln. Time: 2:23 AM/PM Duration: 10 min. x2

Date: 5/1/08 Temperature/Wind Speed: 74/1mph Speed Limit 40 mph Noise Level: 60.3 dBA Leq
56.7 dBA Leq

PROFESSIONAL ENGINEERS, INC

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Noise Sampling Field Monitoring Data

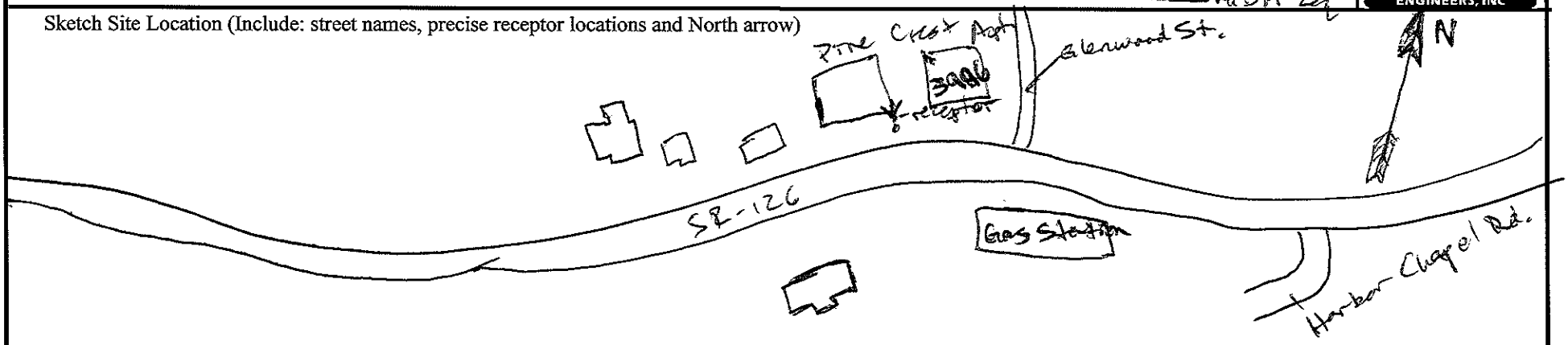
Loc 24

Location (Street Address) 3996 Memorial Blvd (126) Time: 2:50 AM/PM Duration: 10 min. x2

Date: 5/1/08 Temperature/Wind Speed: 74/1mph Speed Limit 40 mph Noise Level: 65.6 dBA Leq

62.7 dBA Leq

Sketch Site Location (Include: street names, precise receptor locations and North arrow)



Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

#2Date: _____ Temperature/Wind Speed: _____ Speed Limit _____ Noise Level: _____ dBA Leq

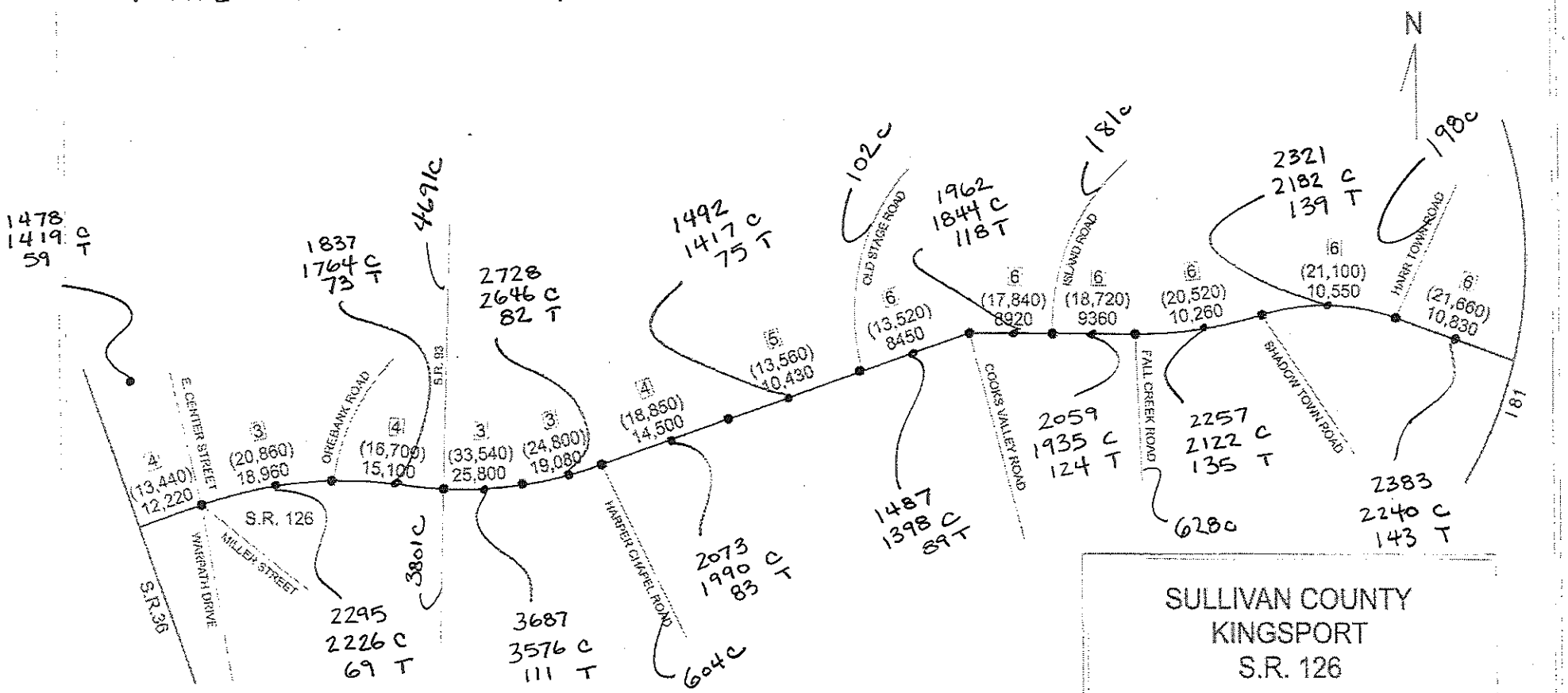
Segment	Direction	Cars/Light Trucks	Medium Trucks	Heavy Trucks
1				
2				
3				
4				

Additional Comments (e.g. Major intrusive events): _____

Appendix B
Traffic

HIGHWAY TRAFFIC NOISE

FUTURE FOR ALTERNATIVES A & B



SULLIVAN COUNTY
KINGSPORT
S.R. 126

2033 AADT - (000)
2013 AADT - 000
AADT Truck % - [0]

9/16/2009
G. Dyer / B. Darks

NOT TO SCALE

K factor = 0.11

AADT * K = DHV

DHV * [0] = # HT (T)

DHV - HT = CARS (C)

Appendix C
TNM 2.5 Data Output

HMB 31 August 2010
mdg TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 1135
RUN: SR 126 Memorial Blvd. Alternative A
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	63.2	64.7	66	1.5	10	----	64.7	0.0	8	-8.0
Receiver2	2	1	60.1	64.9	66	4.8	10	----	64.9	0.0	8	-8.0
Receiver3	3	1	63.0	66.0	66	3.0	10	Snd Lvl	66.0	0.0	8	-8.0
Receiver4	4	1	73.1	69.7	66	-3.4	10	Snd Lvl	69.7	0.0	8	-8.0
Receiver5	5	1	57.2	65.9	66	8.7	10	----	65.9	0.0	8	-8.0
Receiver6	6	1	58.9	63.8	66	4.9	10	----	63.8	0.0	8	-8.0
Receiver7	7	1	43.8	56.7	66	12.9	10	Sub'l Inc	56.7	0.0	8	-8.0
Receiver8	8	1	43.6	54.8	66	11.2	10	Sub'l Inc	54.8	0.0	8	-8.0
Receiver9	9	1	61.2	63.5	66	2.3	10	----	63.5	0.0	8	-8.0
Receiver10	10	1	57.8	63.9	66	6.1	10	----	63.9	0.0	8	-8.0
Receiver11	11	1	58.2	61.6	66	3.4	10	----	61.6	0.0	8	-8.0
Receiver12	12	1	54.9	59.5	66	4.6	10	----	59.5	0.0	8	-8.0
Receiver13	13	1	60.2	65.5	66	5.3	10	----	65.5	0.0	8	-8.0
Receiver14	14	1	69.9	65.8	66	-4.1	10	----	65.8	0.0	8	-8.0
Receiver15	15	1	65.2	66.1	66	0.9	10	Snd Lvl	66.1	0.0	8	-8.0
Receiver16	16	1	62.4	67.6	66	5.2	10	Snd Lvl	67.6	0.0	8	-8.0
Receiver17	17	1	55.3	68.6	66	13.3	10	Both	68.6	0.0	8	-8.0
Receiver18	18	1	67.1	68.3	66	1.2	10	Snd Lvl	68.3	0.0	8	-8.0
Receiver19	19	1	65.2	68.0	66	2.8	10	Snd Lvl	68.0	0.0	8	-8.0
Receiver20	20	1	48.9	62.0	66	13.1	10	Sub'l Inc	62.0	0.0	8	-8.0
Receiver21	21	1	52.4	61.3	66	8.9	10	----	61.3	0.0	8	-8.0
Receiver22	22	1	60.1	64.3	66	4.2	10	----	64.3	0.0	8	-8.0
Receiver23	23	1	60.3	63.4	66	3.1	10	----	63.4	0.0	8	-8.0
Receiver24	24	1	65.9	64.8	66	-1.1	10	----	64.8	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	24	0.0	0.0	0.0
All Impacted	10	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HMB 31 August 2010
mdg TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 1135
RUN: SR 126 Memorial Blvd. Alternative B
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	With Barrier Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Receiver1	1	1	63.2	64.6	66	1.4	10	----	64.6	0.0	8	-8.0
Receiver2	2	1	60.1	65.0	66	4.9	10	----	65.0	0.0	8	-8.0
Receiver3	3	1	63.0	66.0	66	3.0	10	Snd Lvl	66.0	0.0	8	-8.0
Receiver4	4	1	73.1	68.7	66	-4.4	10	Snd Lvl	68.7	0.0	8	-8.0
Receiver5	5	1	57.2	64.1	66	6.9	10	----	64.1	0.0	8	-8.0
Receiver6	6	1	58.9	67.1	66	8.2	10	Snd Lvl	67.1	0.0	8	-8.0
Receiver7	7	1	43.8	56.5	66	12.7	10	Sub'l Inc	56.5	0.0	8	-8.0
Receiver8	8	1	43.6	55.2	66	11.6	10	Sub'l Inc	55.2	0.0	8	-8.0
Receiver9	9	1	61.2	61.8	66	0.6	10	----	61.8	0.0	8	-8.0
Receiver10	10	1	57.8	64.1	66	6.3	10	----	64.1	0.0	8	-8.0
Receiver11	11	1	58.2	60.7	66	2.5	10	----	60.7	0.0	8	-8.0
Receiver12	12	1	54.9	59.9	66	5.0	10	----	59.9	0.0	8	-8.0
Receiver13	13	1	60.2	65.7	66	5.5	10	----	65.7	0.0	8	-8.0
Receiver14	14	1	69.9	68.1	66	-1.8	10	Snd Lvl	68.1	0.0	8	-8.0
Receiver15	15	1	65.2	66.9	66	1.7	10	Snd Lvl	66.9	0.0	8	-8.0
Receiver16	16	1	62.4	66.4	66	4.0	10	Snd Lvl	66.4	0.0	8	-8.0
Receiver17	17	1	55.3	65.3	66	10.0	10	Sub'l Inc	65.3	0.0	8	-8.0
Receiver18	18	1	67.1	65.2	66	-1.9	10	----	65.2	0.0	8	-8.0
Receiver19	19	1	65.2	67.0	66	1.8	10	Snd Lvl	67.0	0.0	8	-8.0
Receiver20	20	1	48.9	59.4	66	10.5	10	Sub'l Inc	59.4	0.0	8	-8.0
Receiver21	21	1	52.4	59.8	66	7.4	10	----	59.8	0.0	8	-8.0
Receiver22	22	1	60.1	63.1	66	3.0	10	----	63.1	0.0	8	-8.0
Receiver23	23	1	60.3	62.9	66	2.6	10	----	62.9	0.0	8	-8.0
Receiver24	24	1	65.9	64.3	66	-1.6	10	----	64.3	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	Avg	Max
		dB	dB	dB
All Selected	24	0.0	0.0	0.0
All Impacted	11	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

HMB 24 September 2010
mdg TNM 2.5
Calculated with TNM 2.5
RESULTS: SOUND LEVELS
PROJECT/CONTRACT: 1135
RUN: SR 126 Memorial Blvd. Alternative A
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 68 deg F, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
50 feet	26	1	0.0	69.2	66	69.2	10	Snd Lvl	69.2	0.0	8	-8.0
100 feet	27	1	0.0	66.2	66	66.2	10	Snd Lvl	66.2	0.0	8	-8.0
250 feet	28	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
500 feet	29	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Avg	Max
		dB	dB	dB
All Selected	4	0.0	0.0	0.0
All Impacted	2	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Appendix D
Mobile Source Air Toxics (MSAT) Analysis

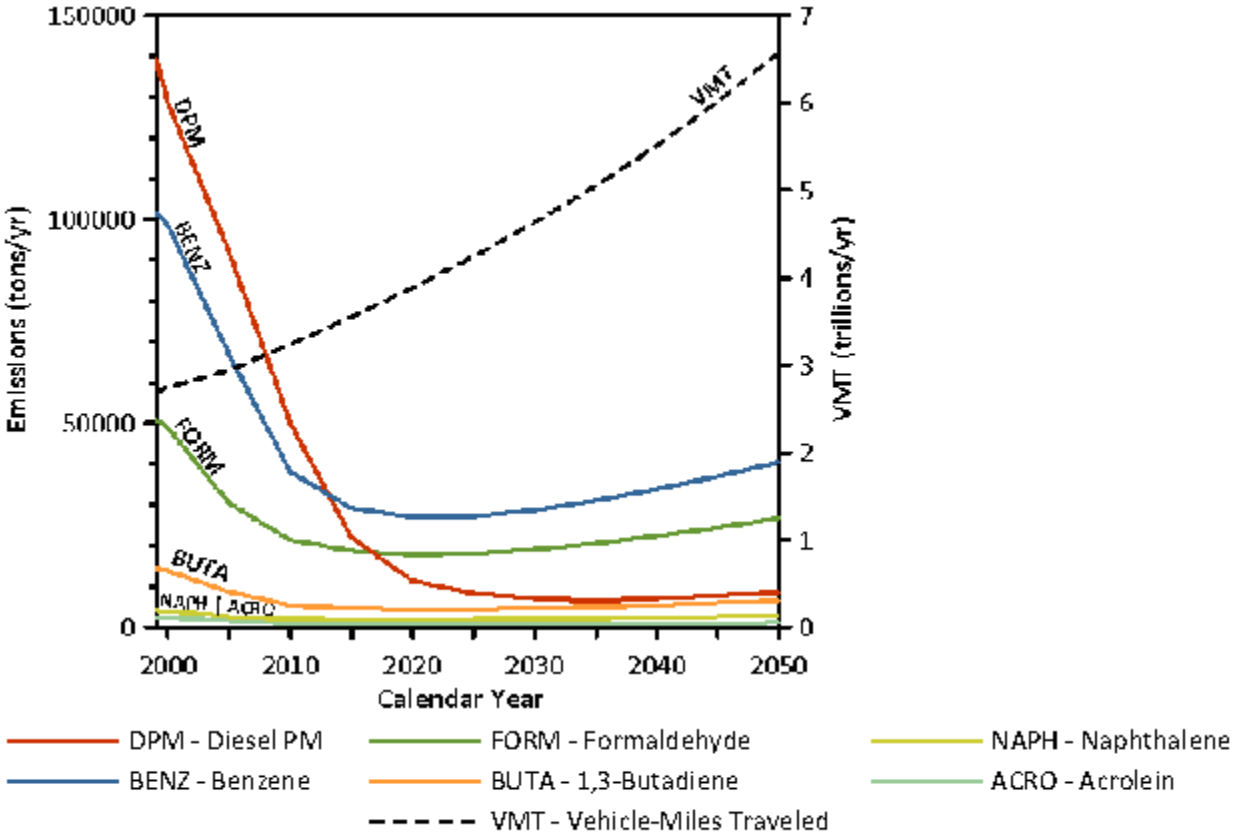
Mobile Source Air Toxics Discussion

Background

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the U.S. Environmental Protection Agency (EPA) regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/ncea/iris/index.html). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle-miles traveled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in Figure 1.

Figure 1 National MSAT Emission Trends, 1999 – 2050, for Vehicles Operating on Roadways, Using EPA's MOBILE6.2 Model



Note: (1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.

(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the National Environmental Policy Act (NEPA).

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

NEPA Context
The NEPA requires, to the fullest extent possible, that the policies, regulations, and laws of the Federal Government be interpreted and administered in accordance with its environmental protection goals. The NEPA also requires Federal agencies to use an interdisciplinary approach in planning and decision-making for any action that adversely impacts the environment. The NEPA requires and FHWA is committed to the examination and avoidance of potential impacts to the natural and human environment when considering approval of proposed transportation projects. In addition to evaluating the potential environmental effects, we must also take into account the need for safe and efficient transportation in reaching a decision that is in the best overall public interest. The FHWA policies and procedures for implementing NEPA is prescribed by regulation in 23 CFR § 771.

ANALYSIS of MSAT in NEPA Documents
The FHWA developed a tiered approach for analyzing MSAT in NEPA documents, depending on specific project circumstances. The FHWA has identified three levels of analysis:

1. No analysis for projects with no potential for meaningful MSAT effects;
2. Qualitative analysis for projects with low potential MSAT effects; or
3. Quantitative analysis to differentiate alternatives for projects with higher potential MSAT effects.

For projects warranting MSAT analysis, the seven priority MSAT should be analyzed.

(1) Projects with No Meaningful Potential MSAT Effects or Exempt Projects.
The types of projects included in this category are:

- Projects qualifying as a categorical exclusion under 23 CFR 771.117(c);
- Projects exempt under the Clean Air Act conformity rule under 40 CFR 93.126; or
- Other projects with no meaningful impacts on traffic volumes or vehicle mix.

For projects that are categorically excluded under 23 CFR 771.117(c), or are exempt from conformity requirements under the Clean Air Act pursuant to 40 CFR 93.126, no analysis or discussion of MSAT is necessary. Documentation sufficient to demonstrate that the project qualifies as a categorical exclusion and/or exempt project will suffice. For other projects with no or negligible traffic impacts, regardless of the class of NEPA environmental document, no MSAT analysis is required[1]. However, the project record should document the basis for the determination of "no meaningful potential impacts" with a brief description of the factors considered.

(2) Projects with Low Potential MSAT Effects
The types of projects included in this category are those that serve to improve operations of highway, transit or freight without adding substantial new capacity or without creating a facility that is likely to meaningfully increase MSAT emissions. This category covers a broad range of projects.

We anticipate that most highway projects that need an MSAT assessment will fall into this category. Any projects not meeting the criteria in subsection (1) or subsection (3) as follows should be included in this category. Examples of these types of projects are

minor widening projects; new interchanges, such as those that replace a signalized intersection on a surface street; or projects where design year traffic is projected to be less than 140,000 to 150,000 annual average daily traffic (AADT).

For these projects, a qualitative assessment of emissions projections should be conducted. This qualitative assessment would compare, in narrative form, the expected effect of the project on traffic volumes, vehicle mix, or routing of traffic and the associated changes in MSAT for the project alternatives, based on VMT, vehicle mix, and speed. It would also discuss national trend data projecting substantial overall reductions in emissions due to stricter engine and fuel regulations issued by EPA. Because the emission effects of these projects are low, we expect there would be no appreciable difference in overall MSAT emissions among the various alternatives. In addition, quantitative analysis of these types of projects will not yield credible results that are useful to project-level decision-making due to the limited capabilities of the transportation and emissions forecasting tools.

Appendix B includes example language for a qualitative assessment, with specific examples for four types of projects: (1) a minor widening project; (2) a new interchange connecting an existing roadway with a new roadway; (3) a new interchange connecting new roadways; and (4) minor improvements or expansions to intermodal centers or other projects that affect truck traffic. The information provided in Appendix B must be modified to reflect the local and project-specific situation.

(3) Projects with Higher Potential MSAT Effects

This category includes projects that have the potential for meaningful differences in MSAT emissions among project alternatives. We expect a limited number of projects to meet this two-pronged test. To fall into this category, a project must:

- Create or significantly alter a major intermodal freight facility that has the potential to concentrate high levels of diesel particulate matter in a single location; or
- Create new or add significant capacity to urban highways such as interstates, urban arterials, or urban collector-distributor routes with traffic volumes where the AADT is projected to be in the range of 140,000 to 150,000 [2] or greater by the design year;

And also

- Proposed to be located in proximity to populated areas.

Projects falling within this category should be more rigorously assessed for impacts. If a project falls within this category, you should contact the Office of Natural and Human Environment (HEPN) and the Office of Project Development and Environmental Review (HEPE) in FHWA Headquarters for assistance in developing a specific approach for assessing impacts. This approach would include a quantitative analysis to forecast local-specific emission trends of the priority MSAT for both Build Alternatives, to use as a basis of comparison. This analysis also may address the potential for cumulative impacts, where appropriate, based on local conditions. How and when cumulative impacts should be considered would be addressed as part of the assistance outlined above.

If the analysis for a project in this category indicates meaningful differences in levels of MSAT emissions, mitigation options should be identified and considered. You should also consult with HEPN and HEPE if you have a project that does not fall within any of the types of projects listed above, but you think has the potential to substantially increase future MSAT emissions. Although not required, projects with high potential for litigation on air toxics issues may also benefit from a more rigorous quantitative analysis to enhance their defensibility in court.

Qualitative Assessment of SR 126 MSAT

For Alternatives A and B in this analysis, the amount of MSAT emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for both alternatives. The VMT estimated for each of the Build Alternatives is slightly higher than that for the No Build Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. Refer to Table 1 on the following page. This increase in VMT would lead to higher MSAT emissions for the preferred action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE6.2 model, emissions of all of the priority MSAT except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models. Because the estimated VMT under each of the Alternatives are the same, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the project alternatives will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, under both alternatives there may be localized areas where ambient concentrations of MSAT could be higher under certain Build Alternatives than the No Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built between SR 93 and Harbor Chapel Road, under Alternatives A and B. However, the magnitude and the duration of these potential increases compared to the No-Build alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

Table 1 - Estimated ADT and VMT for Current and Future Years

Roadway	Existing ADT/VMT	2033 Build ADT/VMT
Section II (8.4 miles)	18,060/151,704	33,540/281,736

As shown above, the proposed project has relatively low traffic volumes and VMT. Project level analyses are for MSAT effects are not required for projects with negligible traffic impacts. The proposed facility is designed as an upgrade to the existing SR 126 facility with lane and shoulder widening and, as such, would not generate additional capacity on the roadway. Without adding substantial new capacity the facility would not generate meaningful increases in emissions of MSAT.

Incomplete or Unavailable Information

When an agency is evaluating reasonably foreseeable significant adverse effects on the human environment in an environmental impact statement and there is incomplete or unavailable information, the agency shall always make clear that such information is lacking.

a. If the incomplete information relevant to reasonably foreseeable significant adverse impacts is essential to a reasoned choice among alternatives and the overall costs of obtaining it are not exorbitant, the agency shall include the information in the environmental impact statement.
b. If the information relevant to reasonably foreseeable significant adverse impacts cannot be obtained because the overall costs of obtaining it are exorbitant or the means to obtain it are not known, the agency shall include within the environmental impact statement:
    1. a statement that such information is incomplete or unavailable;
    2. a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment;
    3. a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment; and
    4. the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. For the purposes of this section, "reasonably foreseeable" includes impacts that have catastrophic consequences, even if their probability of occurrence is low, provided that the analysis of the impacts is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason.
c. The amended regulation will be applicable to all environmental impact statements for which a Notice to Intent (40 CFR 1508.22) is published in the Federal Register on or after May 27, 1986. For environmental impact statements in progress, agencies may choose to comply with the requirements of either the original or amended regulation.

Incomplete or Unavailable Information for Project Specific MSAT Health Impacts Analysis

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The U.S. Environmental Protection Agency (EPA) is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the Clean Air Act and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/ncea/iris/index.html). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's Interim Guidance Update on Mobile source Air Toxic Analysis in NEPA Documents. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations (HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's DraftMOVES2009 model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring

was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with National Ambient Air Quality Standards for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the Clean Air Act to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million;in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Due to the limitations cited, a discussion such as the example provided in this Appendix (reflecting any local and project-specific circumstances), should be included regarding

incomplete or unavailable information in accordance with Council on Environmental Quality (CEQ) regulations [40 CFR 1502.22(b)]. The FHWA Headquarters and Resource Center staff Victoria Martinez (787) 766-5600 X231, Shari Schaftlein (202) 366-5570, and Michael Claggett (505) 820-2047, are available to provide guidance and technical assistance and support.

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[1]The types of projects categorically excluded under 23 CFR 771.117(d) or exempt from certain conformity requirements under 40 CFR 93.127 does not warrant an automatic exemption from an MSAT analysis, but they usually will have no meaningful impact.

[2]Using EPA's MOBILE6.2 emissions model, FHWA staff determined that this range of AADT would be roughly equivalent to the Clean Air Act definition of a major hazardous air pollutant (HAP) source, i.e., 25 tons/yr for all HAPs or 10 tons/yr for any single HAP. Significant variations in conditions such as congestion or vehicle mix could warrant a different range for AADT; if this range does not seem appropriate for your project please consult with the contacts from HEPN and HEPE identified in this memorandum.

Appendix E
Glossary

23 CFR 772 (Title 23, Code of Federal Regulations, Part 772) "Procedures for Abatement of Highway Traffic Noise and Construction Noise": FHWA regulations for highway traffic noise analysis and abatement during the planning and design of federally aided highway projects.

Abatement: any positive action taken to reduce the impact of highway traffic noise.

Abatement Measures: measures that must be considered in a traffic noise analysis when a highway project will result in a noise impact. These measures include:
- Traffic management
- Alteration of horizontal and vertical alignments
- Acquisition of real property to serve as a buffer zone
- Insulation of public use or nonprofit institutional structures
- Construction of noise barriers

Average Daily Traffic (ADT): the average 24-hour traffic count (vehicles per day). Typically, the total amount of traffic during a stated period (normally one year) divided by the number of days in that period. The ADT is only used as the basis for determining the "Design Hourly Volume" (DHV). The DHV is used to model noise levels.

A-Weighting (dBA): an adjustment in sound meters and traffic noise modeling software to ensure sound levels are measured/calculated in a manner that approximates the sounds that can be heard by the human ear. This is accomplished by suppressing the low and very high frequencies that cannot be heard by the human ear.

Benefitted Receiver: a receiver is "benefitted" if an abatement measure reduces the noise level at the receiver by at least 5 dBA, regardless of whether or not the receiver was "impacted." The total number of benefitted receivers is used to evaluate the cost effectiveness of an abatement measure (see "Reasonable").

Cost Effectiveness: see "Reasonable."

Decibel (dB): the basic unit for measuring sound pressure levels.

Design Hourly Volume (DHV): the traffic count (vehicles per hour) determined by applying the "K-factor" to the "Average Daily Traffic." The DHV is used to model noise levels.

Feasible: one of two criteria (see "Reasonable") used to evaluate a noise abatement measure. Generally, pertains to the ability of a noise abatement measure to provide a "substantial reduction" (at least 5 dBA) in noise levels, and deals primarily with engineering considerations.

Impact: when predicted traffic noise reaches a level that requires a consideration of noise abatement.

L_{eq} (Equivalent Noise Level): the equivalent steady-state sound level that, in a given time period, contains the same acoustic energy as a time-varying sound level during the same period.

Noise Abatement Criteria (NAC): absolute sound levels, provided by FHWA, that are used to determine when a noise impact occurs. They are not used as a design goal for a noise abatement measure.

Noise Barrier: typically, a solid wall-like structure located between the noise source (traffic) and the impacted receiver (human activity area) to reduce noise levels. The construction of a noise barrier is one of the abatement measures that must be considered when a traffic noise analysis indicates that a highway project will result in a noise impact.

Reasonable: one of two criteria (see "Feasible") used to evaluate a noise abatement measure. Generally, pertains to the cost effectiveness of a noise abatement measure and the views/desires of the public.

Receiver: the specific location of an outdoor area where frequent human activity occurs that might be impacted by highway traffic noise and may benefit from reduced noise levels. If no outdoor location can be identified, an interior location may be used.

Appendix B
Design Year Traffic Data

KINGSPORT METROPOLITAN PLANNING ORGANIZATION
TENNESSEE: KINGSPORT, SULLIVAN COUNTY, HAWKINS COUNTY, MOUNT CARMEL, CHURCH HILL
VIRGINIA: SCOTT COUNTY, WEBER CITY, GATE CITY

October 19, 2012

Steve Allen, Director
TDOT – Project Management
Suite 900, James K. Polk Bldg.
505 Deaderick Street
Nashville, Tn. 37243

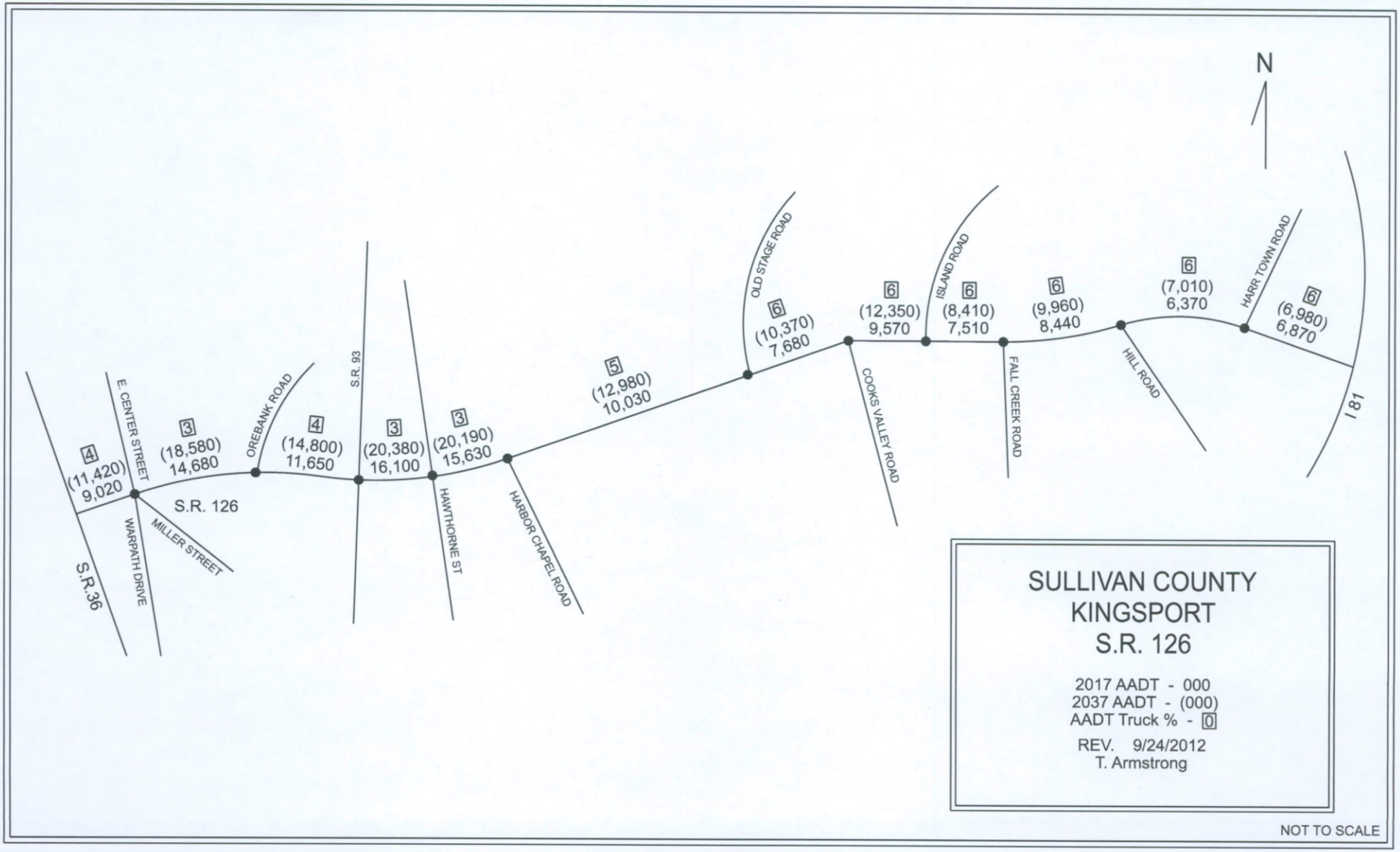
Dear Steve:

We have reviewed the most recent traffic numbers for the State Route 126 project. As we understand it, new traffic counts for all sections of the roadway were conducted by TDOT and subsequently programmed in to our newly completed travel demand model. The model was developed for the recently adopted Kingsport MPO Area Long-Range (Year 2035) Plan. It is our estimation that new counts and projections incorporate recent traffic trends that are a result of recessionary conditions in our areas, which has created stagnate development in and around the traffic analysis zones that generate traffic on State Route 126. We expect this to change moderately once economic conditions improve (this supports the land use element in the long-range plan). We know TDOT's process looks at long-term trends in traffic counts and thus the recent counts are blended or "averaged" in. With this is mind, we hereby concur with the traffic projections that TDOT has developed in the latest model run and report submitted to us a few days ago. Thanks for good work on this important project. In addition, if you need further information please feel free to call us (423) 224-2677.

Sincerely,

William A. Albright, Transportation Planning Manager
Kingsport Tn/Va MPO

225 West Center Street – Kingsport, Tennessee 37660-4237 – Phone (423) 229-9400 Fax (423) 224-2590
www.ci.kingsport.tn.us

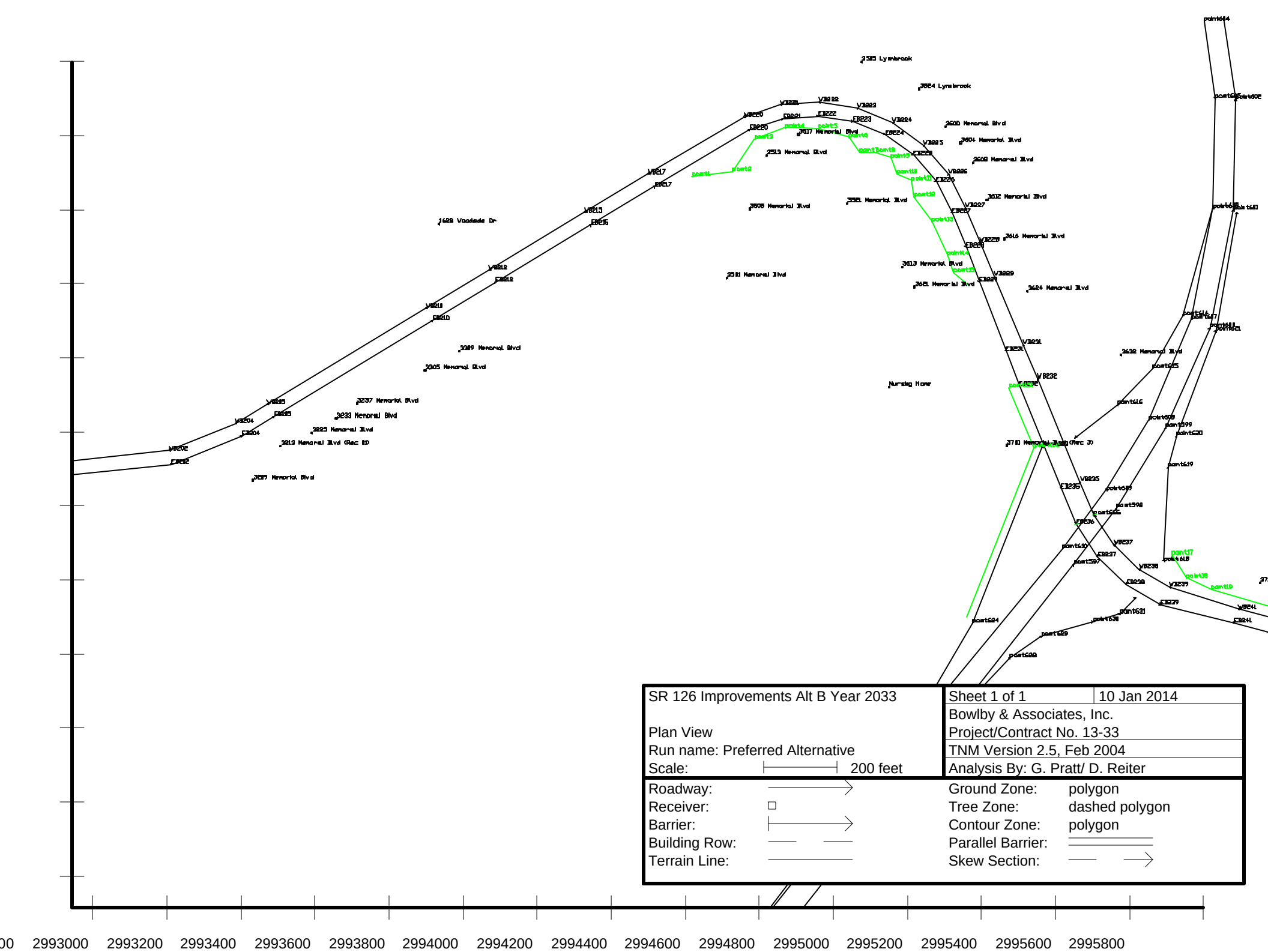

N
4
(11,420)
9,020
E. CENTER STREET
3
(18,580)
14,680
OREBANK ROAD
4
(14,800)
11,650
S.R. 93
3
(20,380)
16,100
3
(20,190)
15,630
5
(12,980)
10,030
OLD STAGE ROAD
6
(10,370)
7,680
6
(12,350)
9,570
ISLAND ROAD
6
(8,410)
7,510
6
(9,960)
8,440
6
(7,010)
6,370
HARR TOWN ROAD
6
(6,980)
6,870
I 81
S.R. 126
S.R.36
WARPATH DRIVE
MILLER STREET
HAWTHORNE ST
HARBOR CHAPEL ROAD
COOKS VALLEY ROAD
FALL CREEK ROAD
HILL ROAD
SULLIVAN COUNTY
KINGSPORT
S.R. 126
2017 AADT - 000
2037 AADT - (000)
AADT Truck % - 0
REV. 9/24/2012
T. Armstrong
NOT TO SCALE

SR 126 Improvements, Sullivan County

Design Year 2037 Traffic Volumes

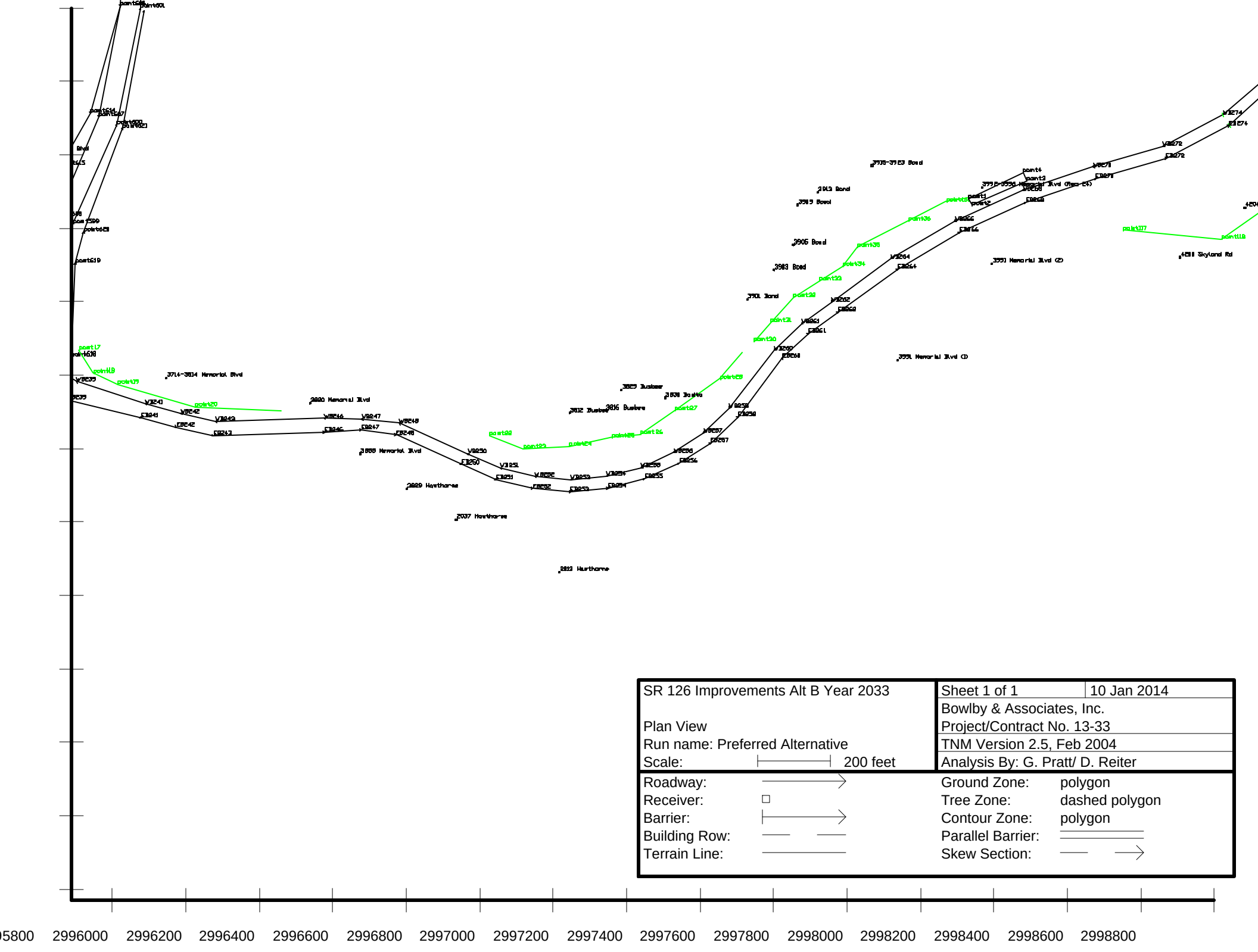
From	*To*	*AADT*	*AADT Trucks*	*DHV Trucks*	*Speed*	*Directional*			
						Total	*Autos*	*MTs*	*HTs*
East Center Street	Orebank Road	18,580	3.0%	2.0%	35	836	819	4	13
Orebank Road	SR 93	14,800	4.0%	2.7%	35	666	648	4	13
SR 93	Hawthorne Street	20,380	3.0%	2.0%	35	917	899	5	14
Hawthorne Street	Harbor Chapel Road	20,190	3.0%	2.0%	35	909	890	5	14
Harbor Chapel Road	Old Stage Road	12,980	5.0%	3.3%	45	584	565	5	15
Old Stage Road	Cooks Valley Road	10,370	6.0%	4.0%	45	467	448	5	14
Cooks Valley Road	Island Road	12,350	6.0%	4.0%	45	556	534	6	17
Island Road	Fall Creek Road	8,410	6.0%	4.0%	45	378	363	4	11
Fall Creek Road	Hill Road	9,960	6.0%	4.0%	45	448	430	4	13
Hill Road	Harr Town Road	7,010	6.0%	4.0%	45	315	303	3	9
Harr Town Road	I-81	6,980	6.0%	4.0%	45	314	302	3	9
Interchange Ramps (One-Lane) [(1)]		7,400	6.0%	4.0%	---	---	---	---	---
Interchange Ramps (Two-Lanes) [(1)]		14,900	6.0%	4.0%	---	---	---	---	---

Appendix C
TNM Plan Views



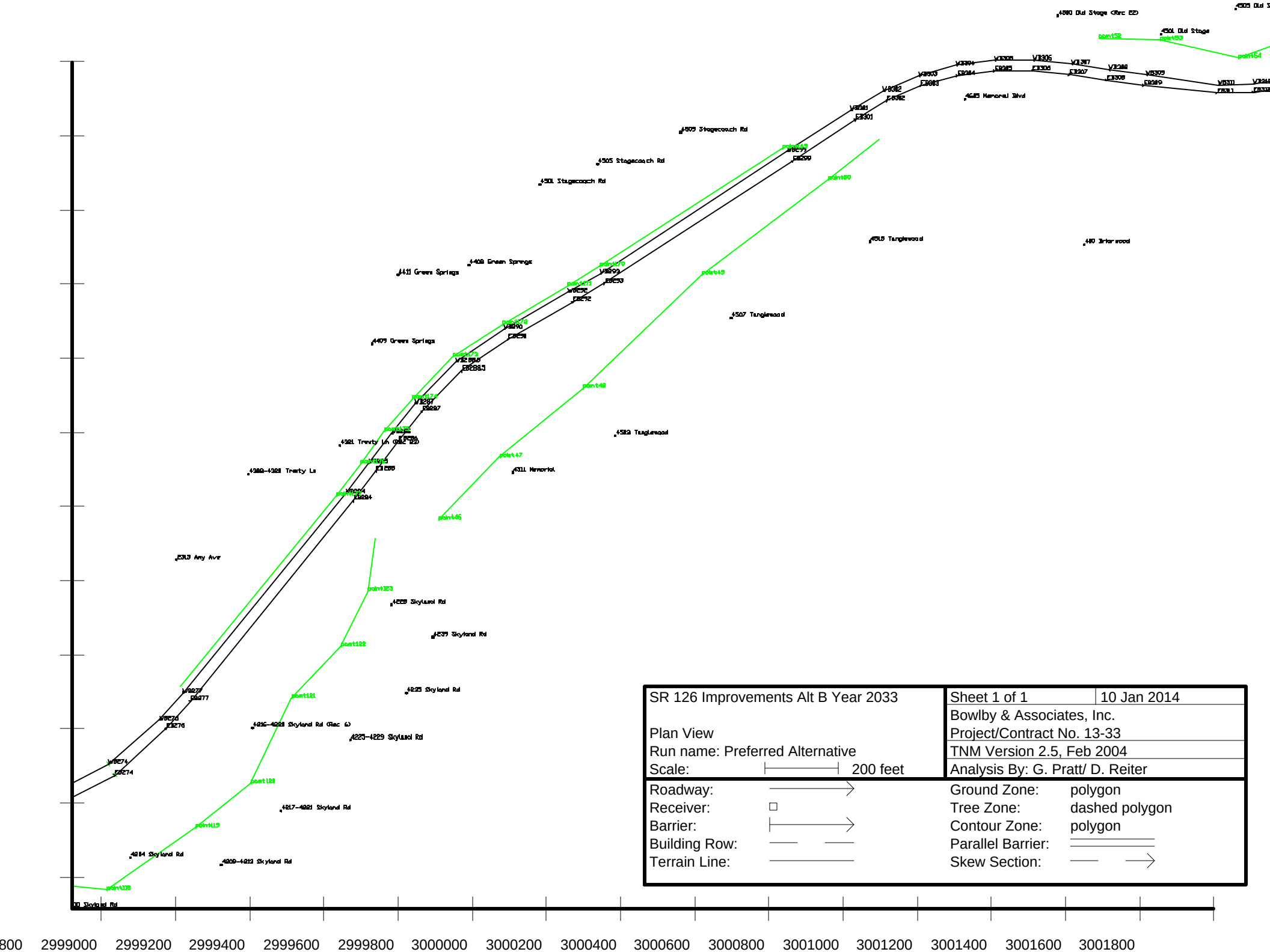
SR 126 Improvements Alt B Year 2033	Sheet 1 of 1 | 10 Jan 2014
	Bowlby & Associates, Inc.
Plan View	Project/Contract No. 13-33
Run name: Preferred Alternative	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: G. Pratt/ D. Reiter

Roadway:		Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	



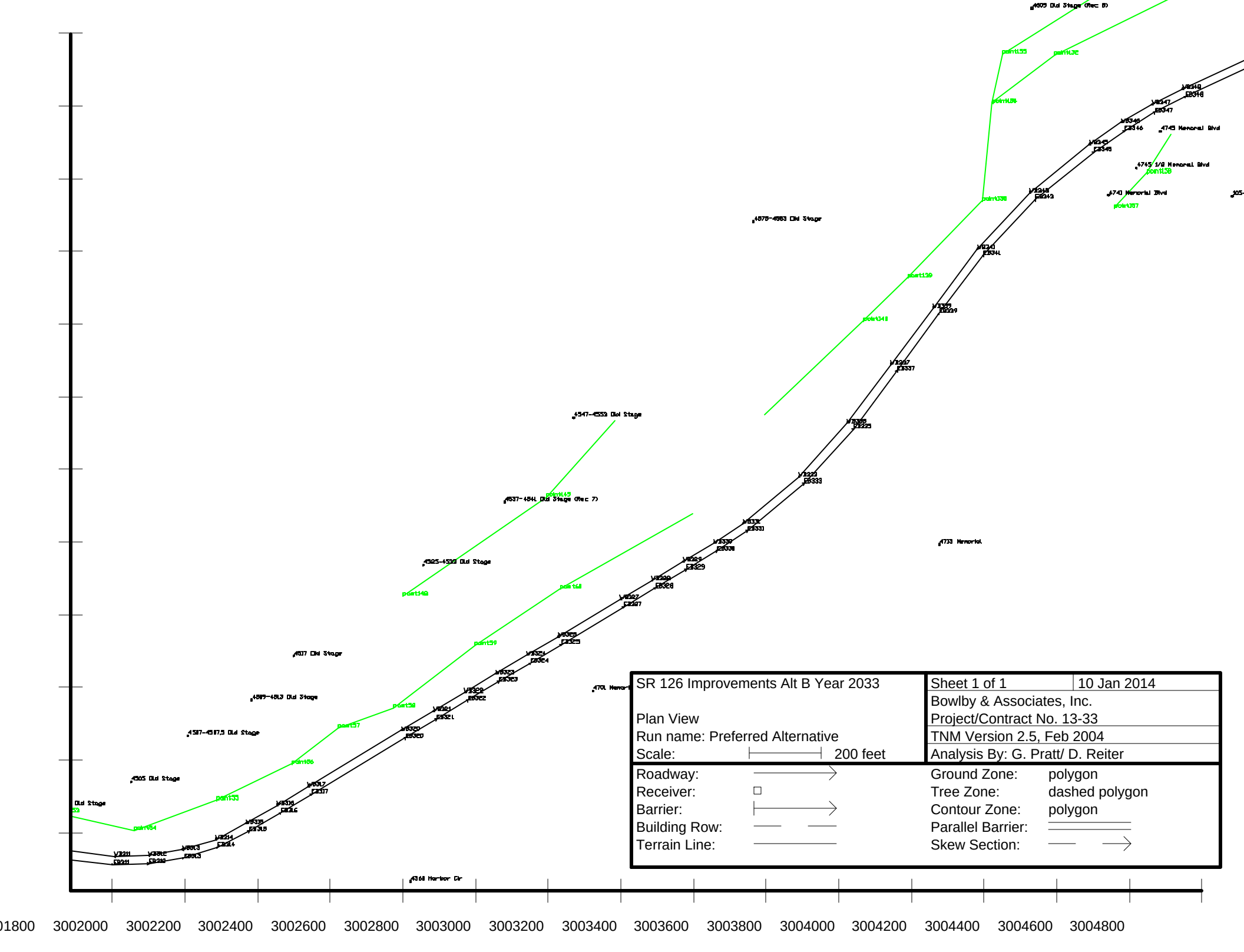
SR 126 Improvements Alt B Year 2033	Sheet 1 of 1 | 10 Jan 2014
	Bowlby & Associates, Inc.
Plan View	Project/Contract No. 13-33
Run name: Preferred Alternative	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: G. Pratt/ D. Reiter

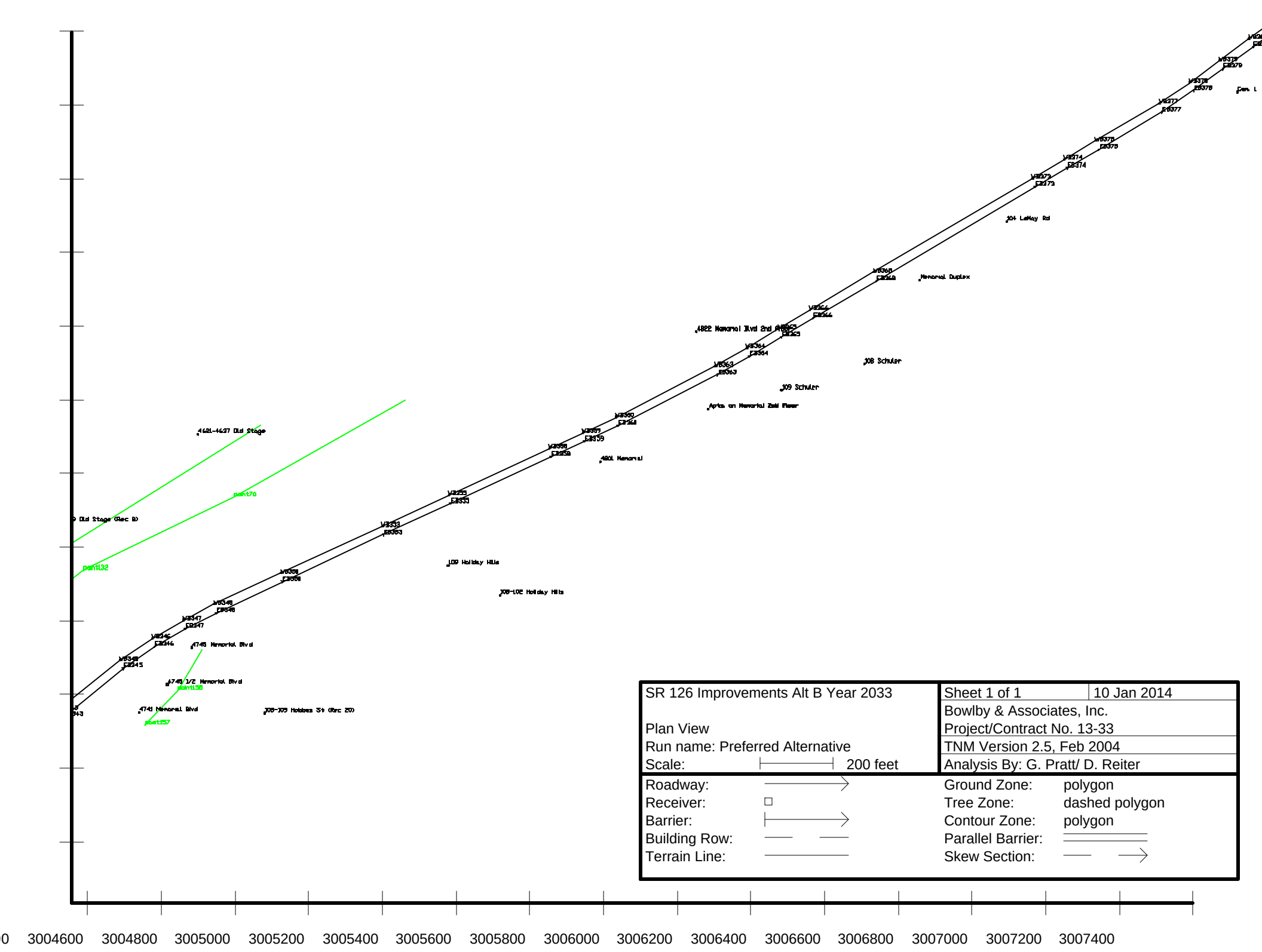
Roadway:		Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	



SR 126 Improvements Alt B Year 2033	Sheet 1 of 1 | 10 Jan 2014
	Bowlby & Associates, Inc.
Plan View	Project/Contract No. 13-33
Run name: Preferred Alternative	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: G. Pratt/ D. Reiter

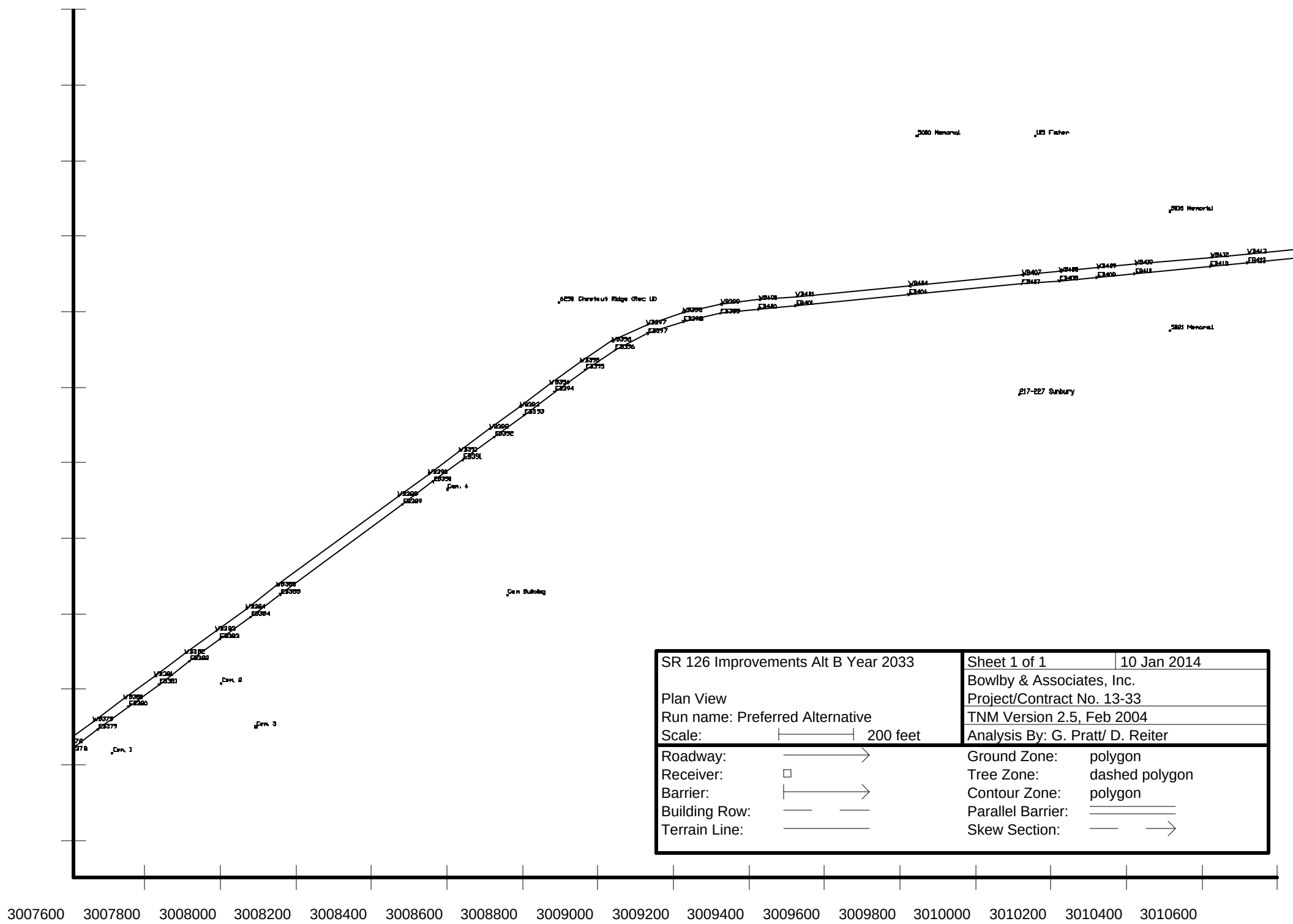
Roadway:		Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	

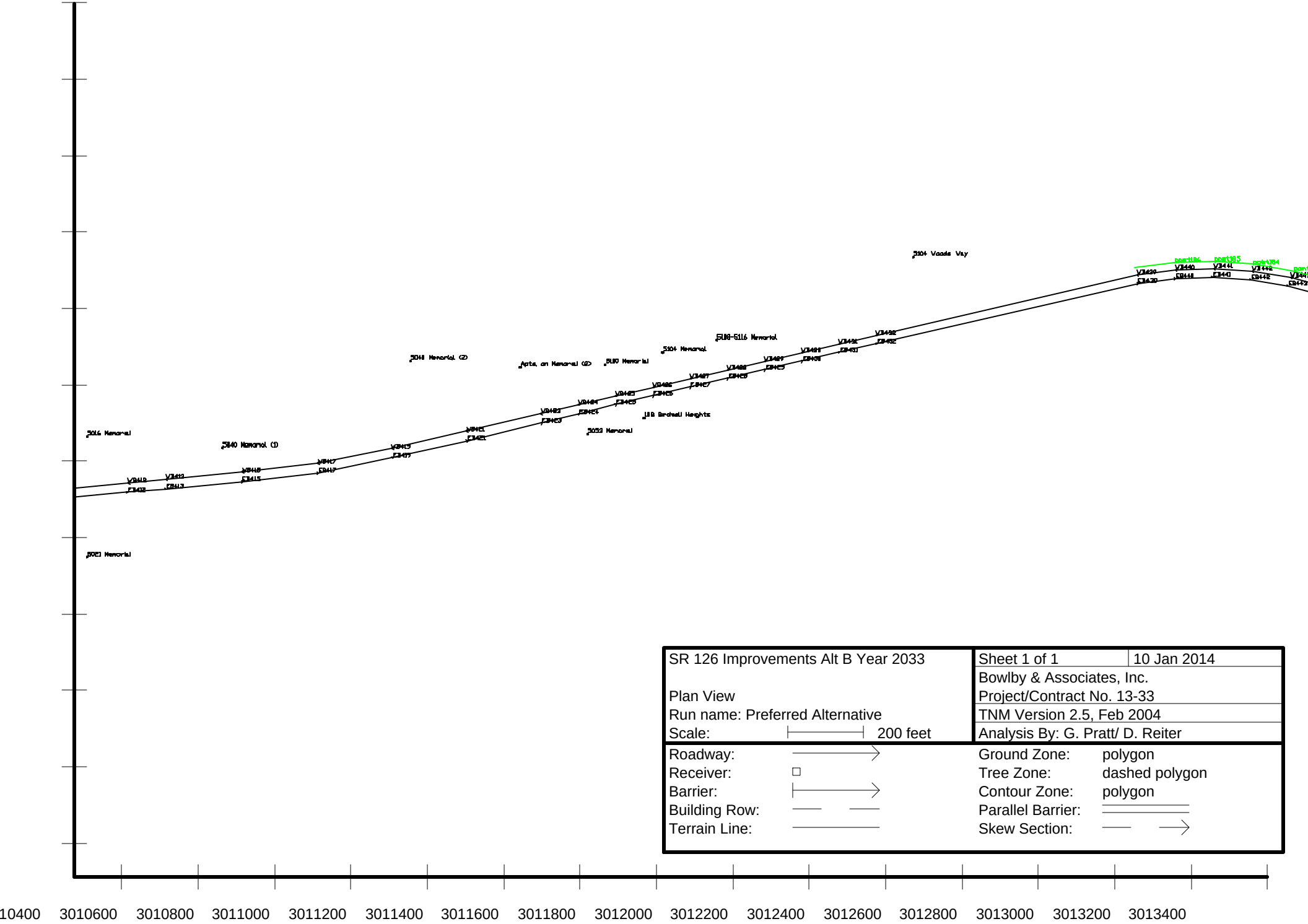

SR 126 Improvements Alt B Year 2033
Plan View
Run name: Preferred Alternative
Scale: 200 feet
Sheet 1 of 1
10 Jan 2014
Bowlby & Associates, Inc.
Project/Contract No. 13-33
TNM Version 2.5, Feb 2004
Analysis By: G. Pratt/ D. Reiter
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:
4745 Memorial Blvd
4741 Memorial Blvd
4733 Memorial
4368 Harbor Dr
3001800
3002000
3002200
3002400
3002600
3002800
3003000
3003200
3003400
3003600
3003800
3004000
3004200
3004400
3004600
3004800



SR 126 Improvements Alt B Year 2033	Sheet 1 of 1 | 10 Jan 2014
	Bowlby & Associates, Inc.
Plan View	Project/Contract No. 13-33
Run name: Preferred Alternative	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: G. Pratt/ D. Reiter

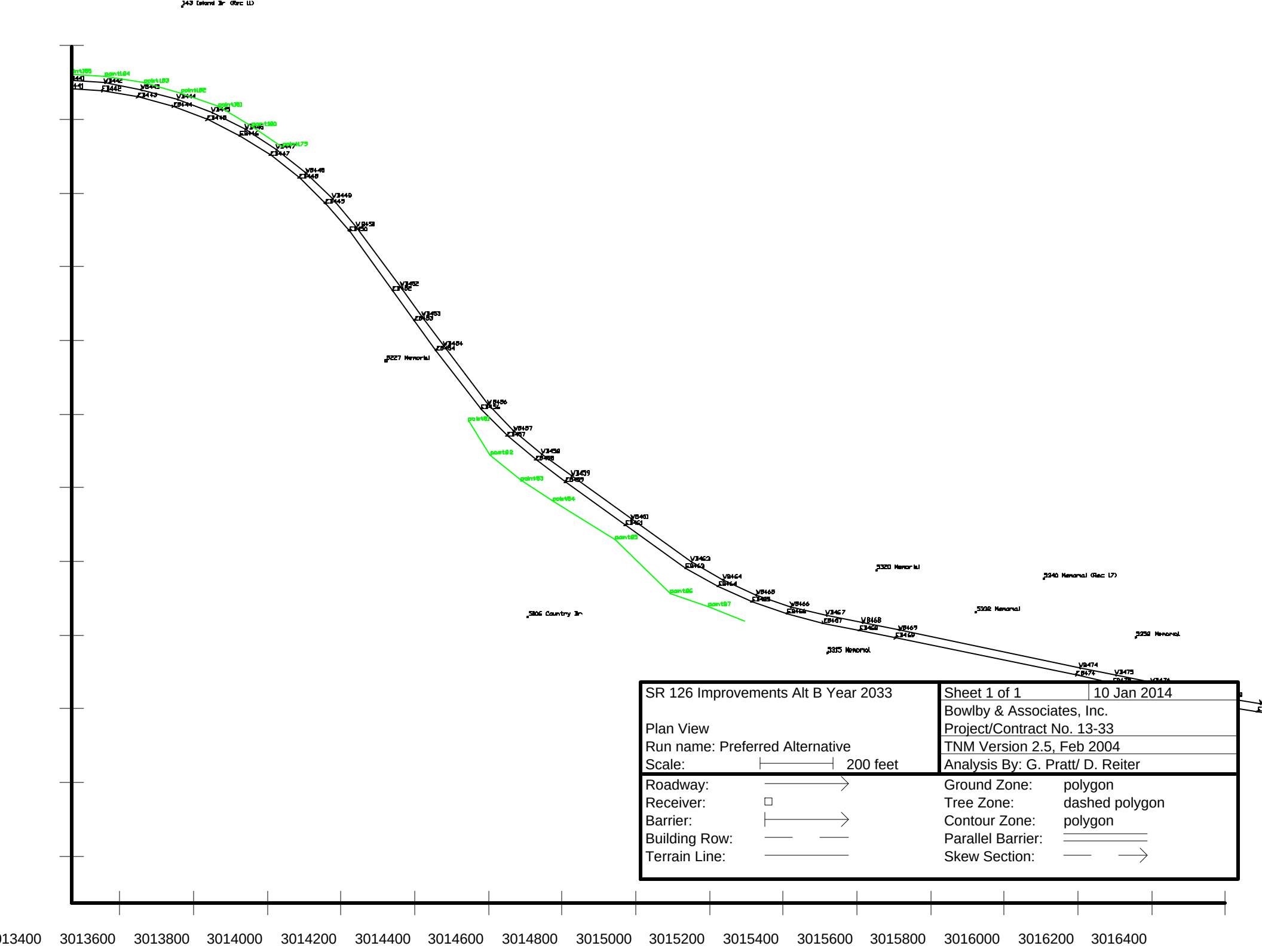
Roadway:		Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	


5080 Memorial
185 Fisher
5036 Memorial
6258 Chestnut Ridge (Rec LD)
5301 Memorial
217-227 Sunbury
Cen Building
Cen. 1
Cen. 2
Cen. 3
Cen. 4
SR 126 Improvements Alt B Year 2033
Plan View
Run name: Preferred Alternative
Scale: 200 feet
Sheet 1 of 1
10 Jan 2014
Bowlby & Associates, Inc.
Project/Contract No. 13-33
TNM Version 2.5, Feb 2004
Analysis By: G. Pratt/ D. Reiter
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:
3007600
3007800
3008000
3008200
3008400
3008600
3008800
3009000
3009200
3009400
3009600
3009800
3010000
3010200
3010400
3010600



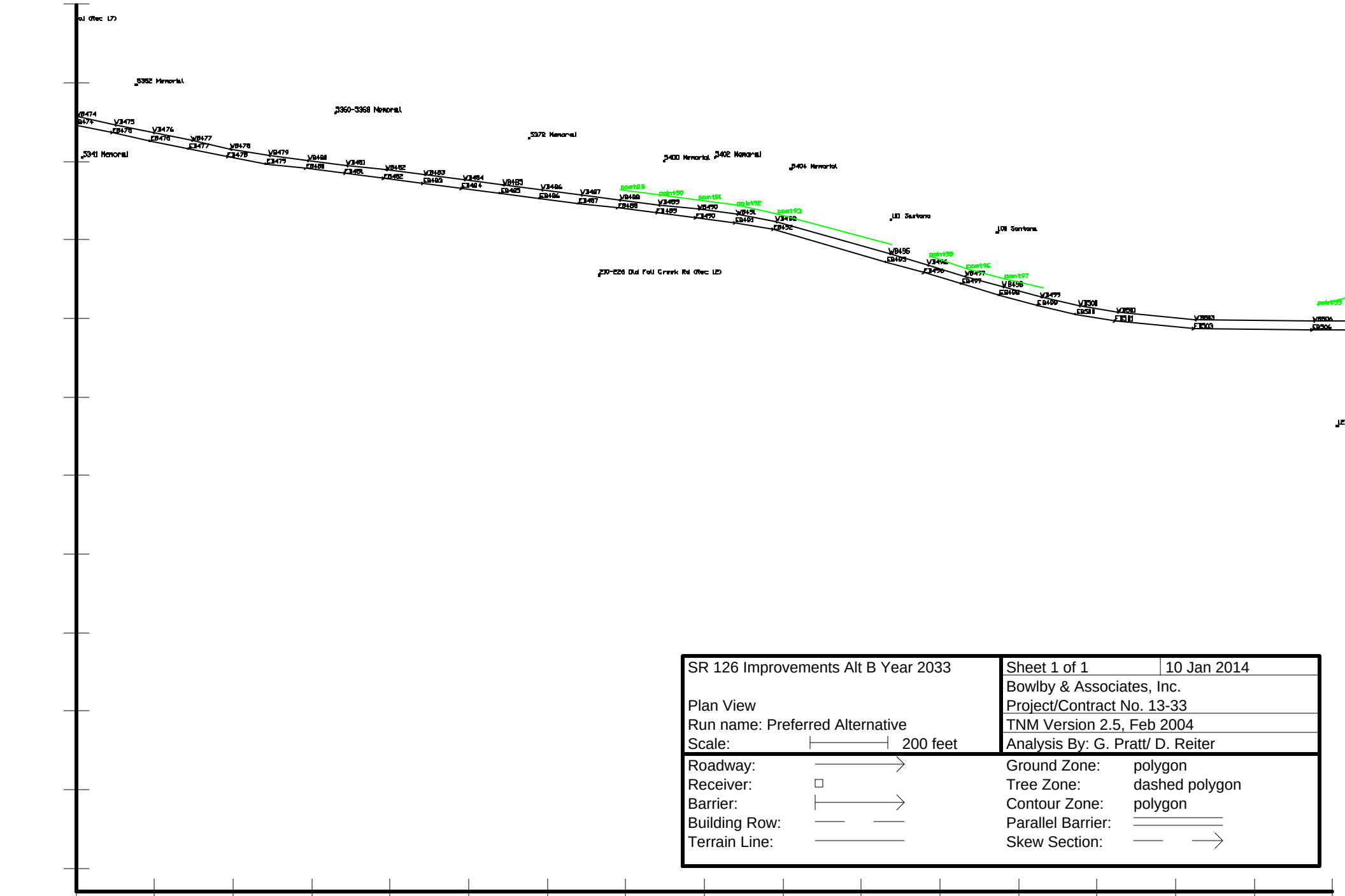
SR 126 Improvements Alt B Year 2033	Sheet 1 of 1 | 10 Jan 2014
	Bowlby & Associates, Inc.
Plan View	Project/Contract No. 13-33
Run name: Preferred Alternative	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: G. Pratt/ D. Reiter

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	



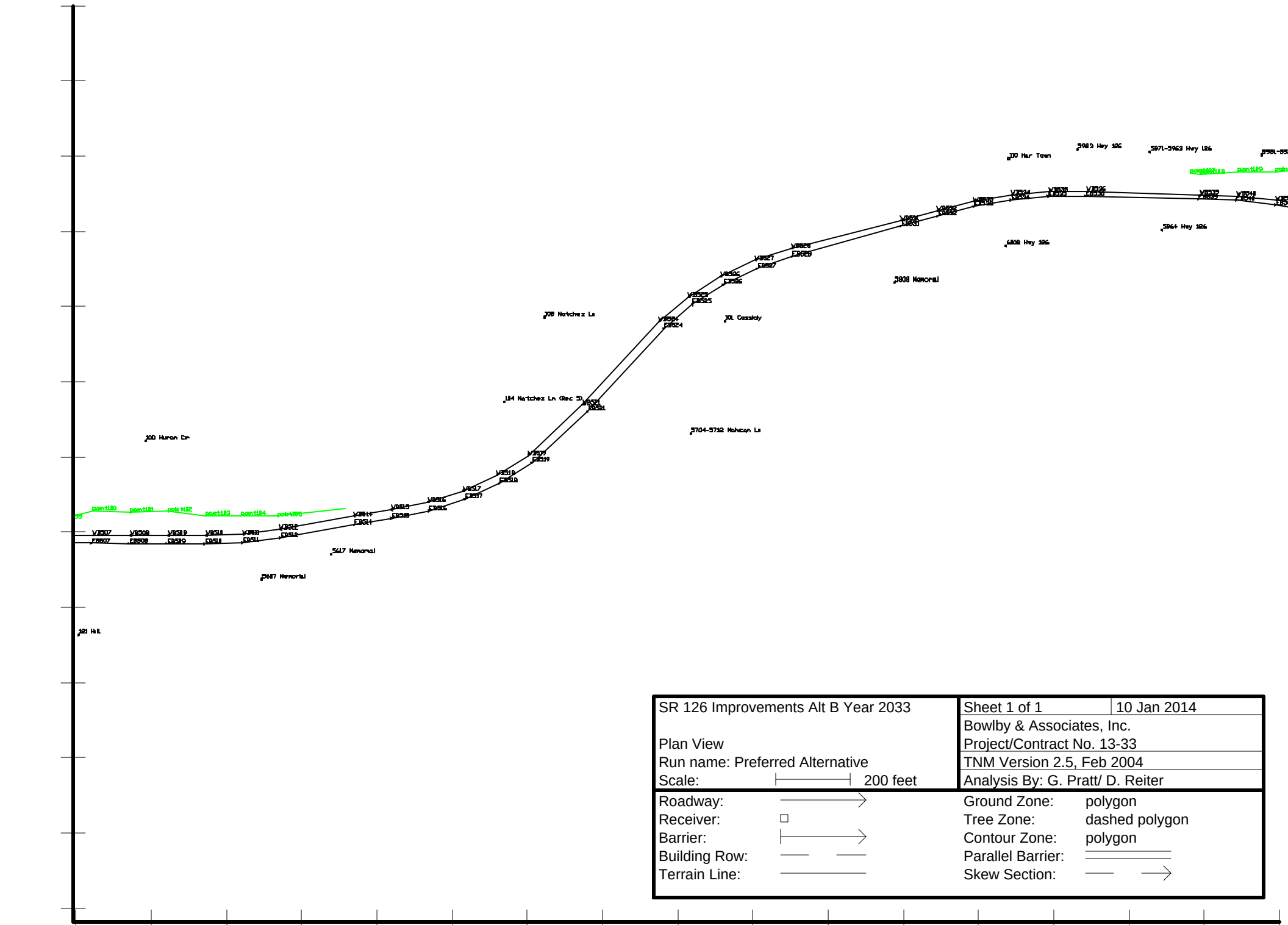
SR 126 Improvements Alt B Year 2033	Sheet 1 of 1 | 10 Jan 2014
	Bowlby & Associates, Inc.
Plan View	Project/Contract No. 13-33
Run name: Preferred Alternative	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: G. Pratt/ D. Reiter

Roadway:		Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	



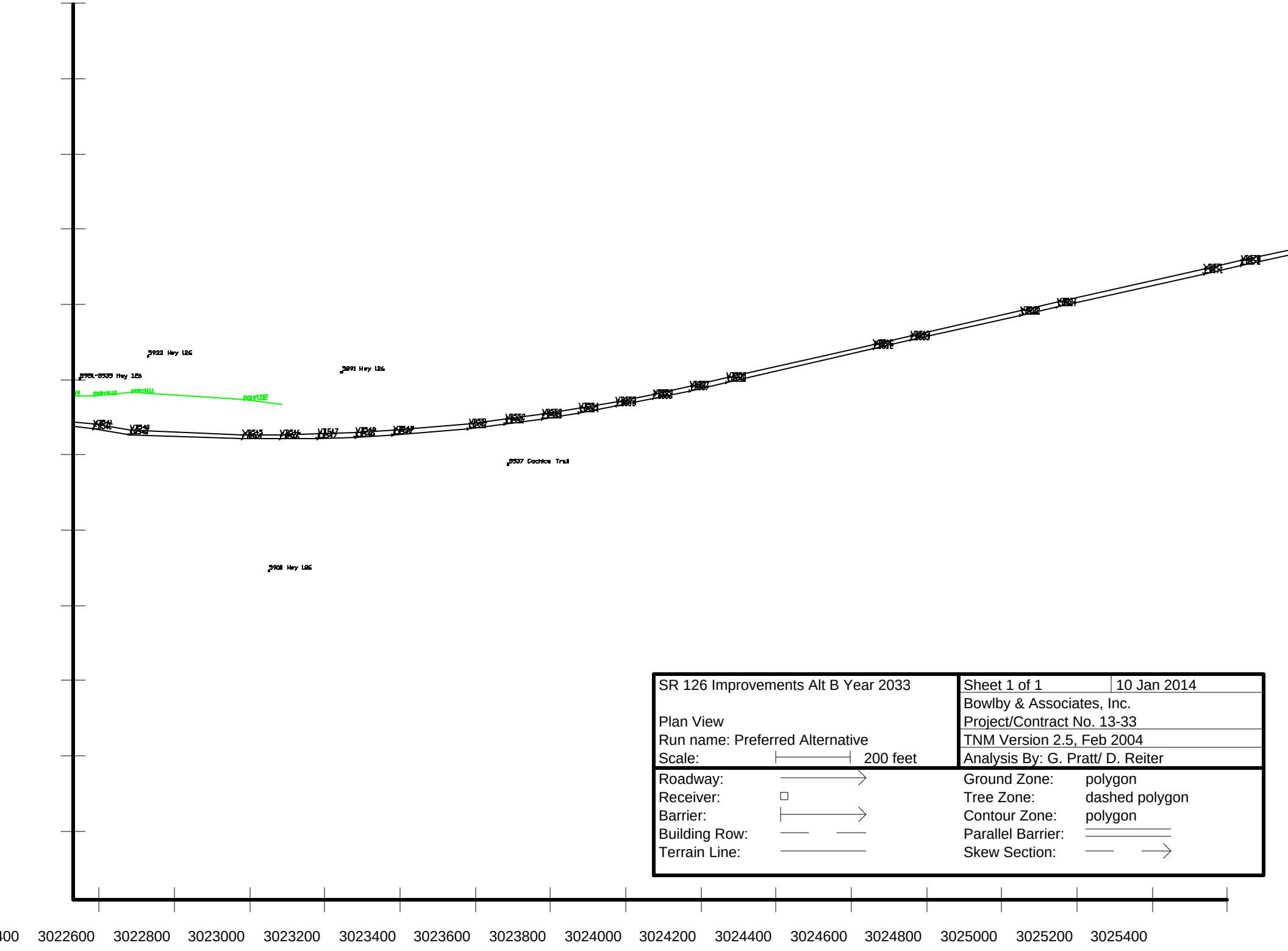
SR 126 Improvements Alt B Year 2033	Sheet 1 of 1 | 10 Jan 2014
	Bowlby & Associates, Inc.
Plan View	Project/Contract No. 13-33
Run name: Preferred Alternative	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: G. Pratt/ D. Reiter

Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	



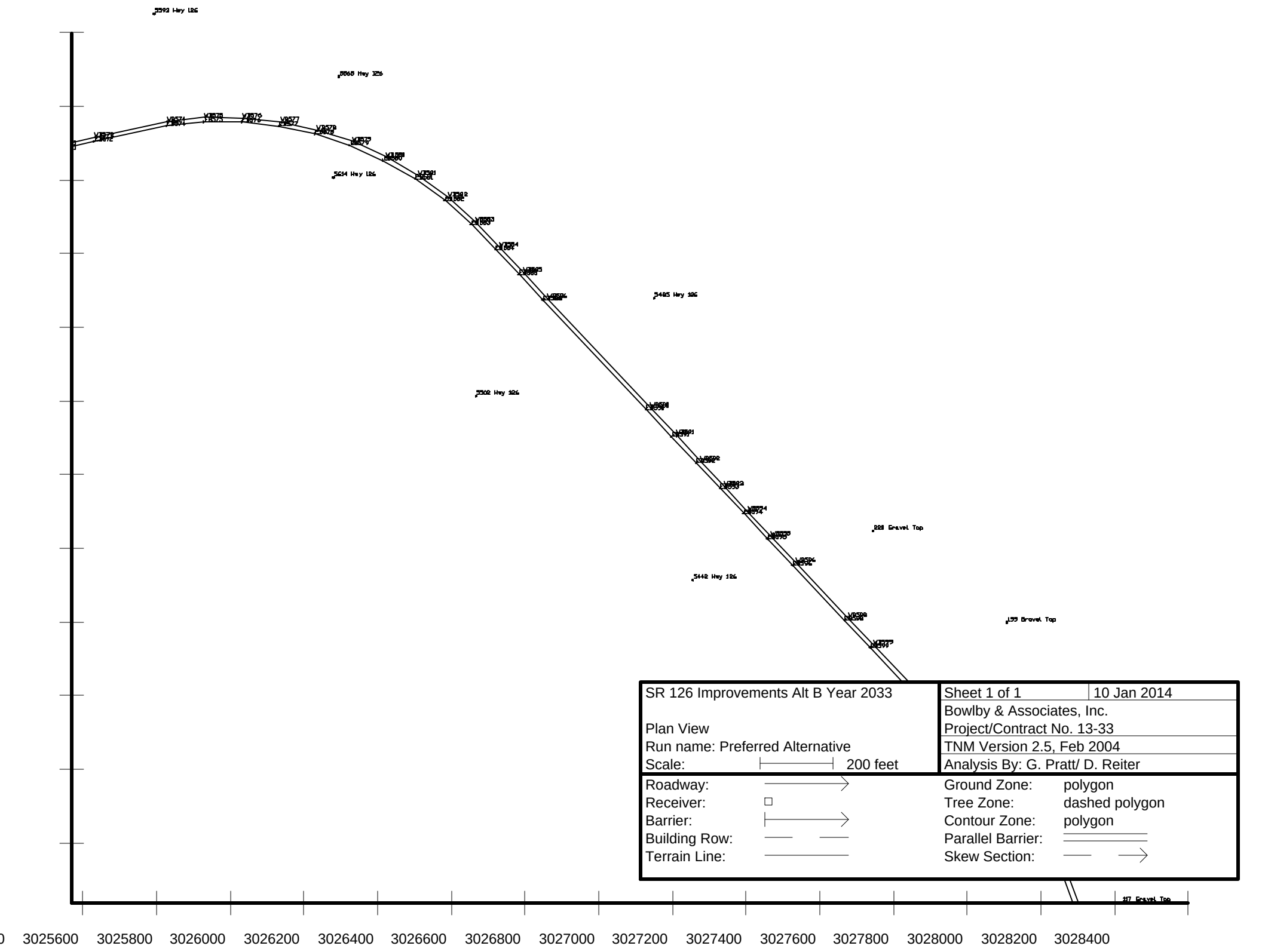
SR 126 Improvements Alt B Year 2033	Sheet 1 of 1 | 10 Jan 2014
	Bowlby & Associates, Inc.
Plan View	Project/Contract No. 13-33
Run name: Preferred Alternative	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: G. Pratt/ D. Reiter

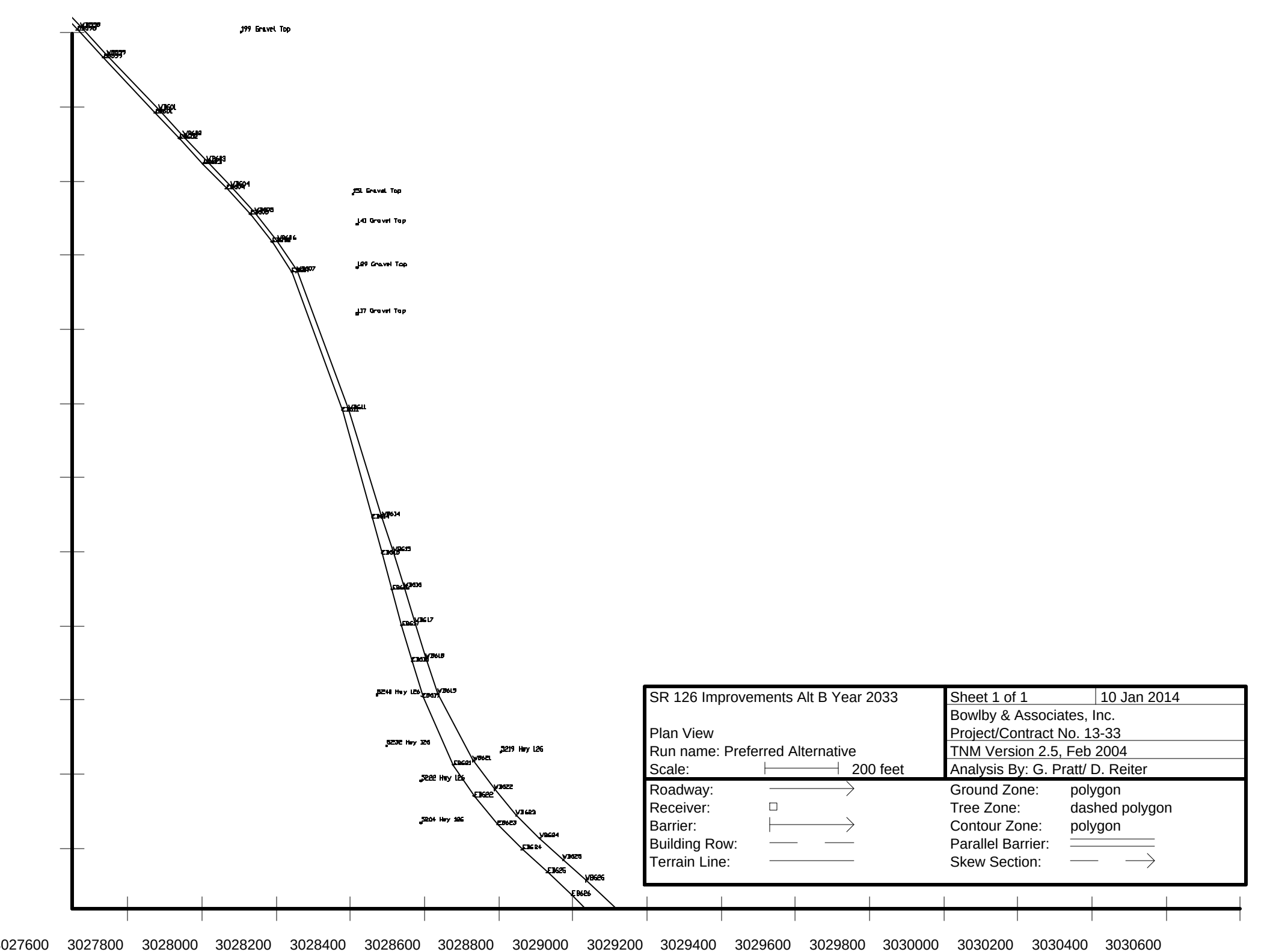
Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	



SR 126 Improvements Alt B Year 2033	Sheet 1 of 1 | 10 Jan 2014
	Bowlby & Associates, Inc.
Plan View	Project/Contract No. 13-33
Run name: Preferred Alternative	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: G. Pratt/ D. Reiter

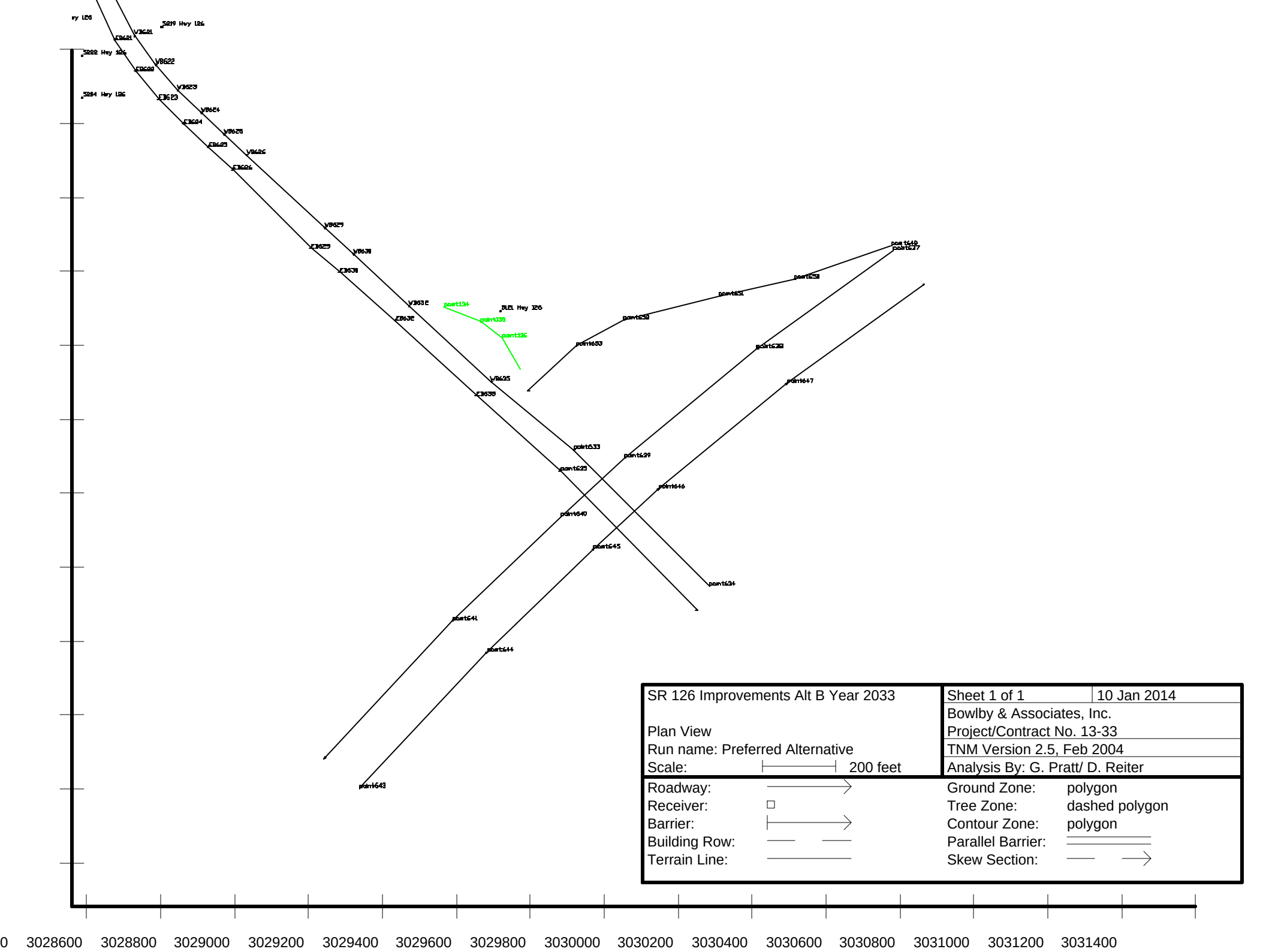
Roadway:		Ground Zone:	polygon
Receiver:		Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	


5393 Hwy 126
5568 Hwy 126
5614 Hwy 126
5485 Hwy 126
5502 Hwy 126
228 Gravel Top
5442 Hwy 126
159 Gravel Top
117 Gravel Top
SR 126 Improvements Alt B Year 2033
Plan View
Run name: Preferred Alternative
Scale: 200 feet
Sheet 1 of 1
10 Jan 2014
Bowlby & Associates, Inc.
Project/Contract No. 13-33
TNM Version 2.5, Feb 2004
Analysis By: G. Pratt/ D. Reiter
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:
3025600
3025800
3026000
3026200
3026400
3026600
3026800
3027000
3027200
3027400
3027600
3027800
3028000
3028200
3028400



SR 126 Improvements Alt B Year 2033	Sheet 1 of 1 | 10 Jan 2014
	Bowlby & Associates, Inc.
Plan View	Project/Contract No. 13-33
Run name: Preferred Alternative	TNM Version 2.5, Feb 2004
Scale: 200 feet	Analysis By: G. Pratt/ D. Reiter

Roadway:		Ground Zone:	polygon
Receiver:	□	Tree Zone:	dashed polygon
Barrier:		Contour Zone:	polygon
Building Row:		Parallel Barrier:	
Terrain Line:		Skew Section:	


SR 126 Improvements Alt B Year 2033
Plan View
Run name: Preferred Alternative
Scale: 200 feet
Sheet 1 of 1
10 Jan 2014
Bowlby & Associates, Inc.
Project/Contract No. 13-33
TNM Version 2.5, Feb 2004
Analysis By: G. Pratt/ D. Reiter
Roadway:
Receiver:
Barrier:
Building Row:
Terrain Line:
Ground Zone: polygon
Tree Zone: dashed polygon
Contour Zone: polygon
Parallel Barrier:
Skew Section:
3028600
3028800
3029000
3029200
3029400
3029600
3029800
3030000
3030200
3030400
3030600
3030800
3031000
3031200
3031400

Appendix D
Design Year Sound Levels and Impacts

Project: SR 126 Improvements, Sullivan County
Scenario: Design Year 2037 Build Preferred Alternative (B Modified)
Background Sound Level (dBA): 40

Receiver	Number of Residences	Design Hour L_{eq} (dBA)		Impacted?	Impacted Residences	Access to SR 126?	Isolated Impact?
		Without Background	With Background				
3209 Memorial Blvd	1	61	61	No	0		
3213 Memorial Blvd (Rec 01)	1	64	64	No	0		
3225 Memorial Blvd	1	63	63	No	0		
3233 Memorial Blvd	1	63	63	No	0		
3237 Memorial Blvd	1	63	63	No	0		
3305 Memorial Blvd	1	62	62	No	0		
3309 Memorial Blvd	1	62	62	No	0		
1628 Woodside Dr	1	56	56	No	0		
3501 Memorial Blvd	1	56	56	No	0		
3505 Memorial Blvd	1	58	58	No	0		
3513 Memorial Blvd	1	63	63	No	0		
3517 Memorial Blvd	***1***	***66***	***66***	***Yes***	***1***	***Yes***	***Yes***
3521 Memorial Blvd	1	57	57	No	0		
3505 Lynnbrook	1	59	59	No	0		
3524 Lynnbrook	1	58	58	No	0		
3600 Memorial Blvd	1	63	63	No	0		
3604 Memorial Blvd	1	63	63	No	0		
3608 Memorial Blvd	1	63	63	No	0		
3612 Memorial Blvd	1	64	64	No	0		
3613 Memorial Blvd	1	59	59	No	0		
3616 Memorial Blvd	1	64	64	No	0		
3621 Memorial Blvd	1	60	60	No	0		
3624 Memorial Blvd	1	62	62	No	0		
3632 Memorial Blvd	1	63	63	No	0		
Nursing Home	1	57	57	No	0		
3701 Memorial Blvd (Rec 3)	1	64	64	No	0		
3714-3814 Memorial Blvd	1	63	63	No	0		
3855 Memorial Blvd	***1***	***66***	***66***	***Yes***	***1***	***Yes***	***Yes***
3829 Hawthorne	1	63	63	No	0		
2037 Hawthorne	1	62	62	No	0		
2013 Hawthorne	1	55	55	No	0		
3812 Busbee	1	57	57	No	0		
3816 Busbee	1	56	56	No	0		
3829 Busbee	1	56	56	No	0		
3830 Bonita	1	61	61	No	0		
3901 Bond	1	62	62	No	0		
3903 Bond	1	59	59	No	0		
3905 Bond	1	60	60	No	0		
3909 Bond	1	57	57	No	0		
3913 Bond	1	57	57	No	0		
3915-3923 Bond	5	58	58	No	0		
3991 Memorial Blvd (1)	1	57	57	No	0		
3991 Memorial Blvd (2)	1	60	60	No	0		
3992-3996 Memorial Blvd (Rec 24)	***4***	***68***	***68***	***Yes***	***4***	***Yes***	***No***
4200 Skyland Rd	1	55	55	No	0		
4204 Skyland Rd	1	60	60	No	0		
4209-4213 Skyland Rd	2	53	53	No	0		
4217-4221 Skyland Rd	2	48	49	No	0		
4225-4229 Skyland Rd	2	51	51	No	0		
4228 Skyland Rd	1	57	57	No	0		
4235 Skyland Rd	1	46	47	No	0		
4239 Skyland Rd	1	48	49	No	0		
2313 Amy Ave	1	52	53	No	0		
4308-4320 Trinity Ln	2	53	53	No	0		
4321 Trinity Ln (Rec 23)	1	60	60	No	0		
4311 Memorial	1	56	56	No	0		
4503 Tanglewood	1	49	50	No	0		
4507 Tanglewood	1	60	60	No	0		
4515 Tanglewood	1	55	56	No	0		
4408 Green Springs	1	51	51	No	0		
4409 Green Springs	1	53	53	No	0		
4411 Green Springs	1	50	50	No	0		
4501 Stagecoach Rd	1	51	51	No	0		
4505 Stagecoach Rd	1	53	53	No	0		
4509 Stagecoach Rd	1	54	54	No	0		
400 Briarwood	1	49	50	No	0		
4500 Old Stage (Rec 22)	1	63	63	No	0		
4501 Old Stage	1	60	60	No	0		
4505 Old Stage	1	55	55	No	0		
4507-4507.5 Old Stage	2	53	53	No	0		
4509-4513 Old Stage	2	54	54	No	0		
4517 Old Stage	1	52	52	No	0		
4525-4533 Old Stage	2	45	46	No	0		
4537-4541 Old Stage (Rec 7)	2	46.4	47	No	0		
4547-4553 Old Stage	2	44	45	No	0		
4575-4583 Old Stage	3	42	44	No	0		

Project: SR 126 Improvements, Sullivan County
Scenario: Design Year 2037 Build Preferred Alternative (B Modified)
Background Sound Level (dBA): 40

Receiver	Number of Residences	Design Hour L_{eq} (dBA) Without Background	With Background	Impacted?	Impacted Residences	Access to SR 126?	Isolated Impact?
4609 Old Stage (Rec 8)	1	45	46	No	0		
4621-4637 Old Stage	4	46	47	No	0		
4360 Harbor Cir	1	48	48	No	0		
4701 Memorial (Rec 21)	1	55.6	56	No	0		
4713 Memorial	1	50	50	No	0		
105-109 Hobbes St (Rec 20)	1	52	53	No	0		
108-102 Holiday Hills	3	52	52	No	0		
109 Schuler	1	56	56	No	0		
108 Schuler	1	54	54	No	0		
Cem. 1	0	61	61	No	0		
Cem. 2	0	59	59	No	0		
Cem. 3	0	54	54	No	0		
Cem. 4	0	68	68	Yes	0		
Cem Building	0	52	52	No	0		
6290 Chestnut Ridge (Rec 10)	1	60	60	No	0		
5000 Memorial	1	51	52	No	0		
5016 Memorial	1	62	62	No	0		
5021 Memorial	1	60	60	No	0		
5040 Memorial (1)	***1***	***67***	***67***	***Yes***	***1***	***Yes***	***Yes***
5040 Memorial (2)	1	58	58	No	0		
5053 Memorial	***1***	***68***	***68***	***Yes***	***1***	***Yes***	***Yes***
217-227 Sunbury	2	53	53	No	0		
105 Fisher	1	52	53	No	0		
108 Birdwell Heights	***1***	***68***	***68***	***Yes***	***1***	***Yes***	***No***
5104 Woods Way	1	60	60	No	0		
143 Island Dr (Rec 11)	1	57	57	No	0		
5227 Memorial	1	61	61	No	0		
5006 Country Dr	1	50	50	No	0		
5315 Memorial	1	64	64	No	0		
5320 Memorial	1	60	60	No	0		
5352 Memorial	1	62	62	No	0		
5340 Memorial (Rec 17)	6	55	55	No	0		
5341 Memorial	1	65	65	No	0		
5372 Memorial	1	62	62	No	0		
210-226 Old Fall Creek Rd (Rec 12)	3	58	58	No	0		
5400 Memorial	1	61	61	No	0		
5402 Memorial	1	60	60	No	0		
5404 Memorial	1	60	60	No	0		
100 Santana	1	62	62	No	0		
121 Hill	1	53	54	No	0		
100 Huron Cir	1	52	52	No	0		
5607 Memorial	1	60	60	No	0		
5617 Memorial	1	64	64	No	0		
104 Natchez Ln (Rec 5)	1	58	58	No	0		
108 Natchez Ln	1	52	52	No	0		
5704-5712 Mohican Ln	3	54	54	No	0		
5808 Memorial	1	59	59	No	0		
110 Har Town	1	56	56	No	0		
6008 Hwy 126	1	61	61	No	0		
5983 Hwy 126	1	58	58	No	0		
5971-5963 Hwy 126	2	62	62	No	0		
5964 Hwy 126	1	63	63	No	0		
5951-5939 Hwy 126	2	60	60	No	0		
5933 Hwy 126	1	55	55	No	0		
5900 Hwy 126	1	50	50	No	0		
5891 Hwy 126	1	58	58	No	0		
5937 Cochice Trail	1	61	61	No	0		
5614 Hwy 126	1	62	62	No	0		
5593 Hwy 126	1	53	53	No	0		
5565 Hwy 126	1	59	59	No	0		
5502 Hwy 126	1	51	52	No	0		
5485 Hwy 126	1	55	56	No	0		
5442 Hwy 126	1	54	55	No	0		
220 Gravel Top	1	56	56	No	0		
199 Gravel Top	1	52	52	No	0		
151 Gravel Top	1	54	54	No	0		
141 Gravel Top	1	55	55	No	0		
129 Gravel Top	1	58	58	No	0		
117 Gravel Top	1	61	61	No	0		
5240 Hwy 126	1	61	61	No	0		
5232 Hwy 126	1	59	59	No	0		
5222 Hwy 126	1	62	62	No	0		
5204 Hwy 126	1	58	58	No	0		
5121 Hwy 126	***1***	***66***	***66***	***Yes***	***1***	***Yes***	***Yes***
3820 Memorial Blvd.	***3***	***67***	***67***	***Yes***	***3***	***Yes***	***No***
109 Holiday Hills	1	54	55	No	0		

Project:	**SR 126 Improvements, Sullivan County**
Scenario:	**Design Year 2037 Build Preferred Alternative (B Modified)**
Background Sound Level (dBA):	**40**

Receiver	Number of Residences	Design Hour L_{eq} (dBA)		Impacted?	Impacted Residences	Access to SR 126?	Isolated Impact?
		Without Background	With Background				
4801 Memorial	1	60	60	No	0		
Apts. on Memorial 1st floor	4	64	64	No	0		
Memorial Duplex	2	62	62	No	0		
Apts. on Memorial (2)	6	63	63	No	0		
5100 Memorial	***1***	***66***	***66***	***Yes***	***1***	***Yes***	***No***
5104 Memorial	***1***	***66***	***66***	***Yes***	***1***	***Yes***	***No***
5108-5116 Memorial	***3***	***66***	***66***	***Yes***	***3***	***Yes***	***No***
5332 Memorial	1	63	63	No	0		
5360-5368 Memorial	3	62	62	No	0		
101 Santana	1	64	64	No	0		
101 Cassidy	1	63	63	No	0		
5219 Hwy 126	1	63	63	No	0		
4216-4220 Skyland Rd (Rec 6)	2	62	62	No	0		
4605 Memorial Blvd	***1***	***66***	***66***	***Yes***	***1***	***Yes***	***Yes***
4741 Memorial Blvd	1	57	57	No	0		
4745 1/2 Memorial Blvd	1	58	58	No	0		
4745 Memorial Blvd	1	61	61	No	0		
Apts. on Memorial 2nd floor	4	65	65	No	0		
4822 Memorial Blvd 2nd floor	8	64	64	No	0		
4822 Memorial Blvd 2nd floor	8	64	64	No	0		
104 LeMay Rd	2	62	62	No	0		
				Impacted Residences	***18***		
				Impacted Residences with Direct Access to SR 126	***18***		